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ABSTRACT

Collected together in this volume are the background papers for the National Advisory Committee on Dyslexia and Related Reading Disorders. Papers include "The Nature of the Reading Process"; "Bases of Classification of Reading Disorders"; "Sex Differences in Reading Disability"; "Dyslexia: Neurological and Genetic Etiology"; "Dyslexia and Its Remediation"; "Relation of Early Language Development to Subsequent Reading Disorder"; "Preschool Intervention"; "Preschool Educational Strategies and Issues: A Review"; "The Role of Individual Diagnosis in Remedial Planning for Reading Disorders"; "The Nature of the Reading Process, The Rationale of Non-Educational Remedial Methods"; "Early Identification of Potentially Retarded Readers within the School System"; "School Age Programs: Modifications of Teaching Methods and Materials for Total Population Groups"; "The Teaching of Children with Language Disabilities--Small Groups"; "Manpower"; "Development of Competencies for the Teaching of Reading to Children who have not Learned under Conventional Procedures"; "New Trends in Reading"; "Understanding Learning Disabilities"; and "Directories of Remedial Reading Services." (HOD)

reading forum

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READING FORUM

A Collection of Reference Papers Concerned with Reading Disability

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INTRODUCTION

During 1968-1969, the National Institute of Neurological Diseases and Stroke supported in large measure the efforts and deliberations of the Secretary's (HEW) National Advisory Committee on Dyslexia and Related Reading Disorders.

The final report of this Committee surveyed the scientific evidence relating to reading disorders, and presented recommendations for a framework of public action to meet the needs of children and adults with reading problems. Copies of the report are available from the Institute.

In the course of the project, more than a score of background papers were contributed by leading figures in the field, and these proved invaluable to the Committee. They were not, however, included in the report, nor have they received any official endorsement.

In response to numerous requests for additional materials on reading disorders, we have made available, in this publication, a selection of these background papers. Some are "controversial"; all are interesting, and all offer analyses, approaches, and discussions useful to those concerned with children who do not learn to read effectively.

Edward F MacNichol Jr.

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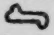
THE NATURE OF THE READING PROCESS

John B. Carroll

As you silently read this very paragraph, what are you doing? If you are a skilled reader and are attending carefully to what this paragraph is trying to say, you will notice the following. First, what are your eyes doing? Moving together in a swift and well-coordinated way, your eyes are making a series of fixations, jumping from place to place on the page of print. The jumps are exceedingly rapid; you see little while your eyes are jumping. What is important are the fixations, when your eyes come to rest. Most of these fixations are actually on or close to the line of print, but unless you are reading quite slowly you cannot easily predict or control where your eyes will fixate. The fixations are usually quite short in duration; each one will last about one-fourth of a second on the average.

Usually the fixations progress from left to right along the first line of print, then back to the beginning of the next line, and again from left to right across the line, and so on. For the average adult reader there will be about two fixations per inch of ordinary type. Some of these fixations may be very brief, amounting to minor adjustments in order to bring the print better into view. During most of the fixations you receive an impression of a certain amount of printed material; that is, you instantaneously perceive and recognize one or more words, perhaps up to four or five in some cases. You are more likely to recognize the words that are in the immediate area of fixation; words outside this immediate area may be less well recognized, but some of them have been recognized in a previous fixation, and others may be more clearly recognized in a future fixation. Some of the words may never be clearly recognized, but you apprehend enough of the stimulus to fill them in from the general drift of what you are reading.

Let us just think about this process of instantaneous word recognition. Most of the words you see are words you have seen many times before: even though in actuality they may be relatively rare, they are familiar enough to you to permit "instantaneous" recognition. Of course recognition is not really instantaneous; it takes a certain amount of time. Experiments in which words are exposed very briefly show that common words can be recognized quite accurately in less than one-tenth of a second; even words that are quite rare can be recognized with at least 50 per cent accuracy in exposures of about one-fifth of a second. During the average fixation lasting one-fourth of a second, it is often possible to take in several words. The point is that most words are recognized extremely rapidly. If you are a skilled reader, you do not have to stop to figure out the pronunciation of a familiar word from its spelling; you are hardly conscious of the spelling at all. Still less do you attend to the particular phonetic values of the letters; in reading the word women, it would scarcely occur to you to note that the "o" in the first syllable stands for a sound that rhymes with "/i/" in whim. The printed word women is a Gestalt-like, total stimulus that immediately calls to mind the spoken word that corresponds to it--or if not the spoken word itself, some underlying response which is also made when the word is spoken. As a skilled reader, you can consider yourself lucky to have a large "sight" vocabulary.

The actual process by which we recognize words is not well understood, simply because the whole process of "pattern perception," as it is called, is one of the most mysterious problems in psychology. How, for example, do we recognize a table, a goblet, or a flagpole for what it is, regardless of the angle of regard? Nevertheless, it is a simple fact that we can learn to recognize words even though the words may be printed in different type-faces or written in different cursive styles, and in different sizes. Now even though word recognition is rapid, it obviously depends to a large extent on cues from the letters composing the word. There is little confusion among such highly similar items as cob, rob, mob, and nob even in fast single exposures. We do know that in recognizing longer words, the letters standing at the beginning and end are more critical than letters in the middle, for in fast exposures these middle letters can sometimes be altered or replaced without this being noticed by the reader. In ordinary reading we frequently fail to notice words that contain printers' errors. But there is little evidence to support the idea that a mature reader recognizes words merely by their outlines or general shape. It is unlikely that if you see the shape  you will recognize the word dog; you might just as well think it to be day or dug. Beginning readers sometimes use mere shape cues in trying to recognize words, but they will be overwhelmed with confusion if they depend solely on such cues apart from the recognition of the letters themselves. In the mature reader the process of rapid word recognition seems to depend upon his ability to integrate the information provided by the separate letters composing the word, some letters being more critical as cues than others. Because the recognizability of a word is apparently correlated rather highly with its frequency of use, word perception seems to be a skill that depends upon large amounts of practice and exposure.

Suppose, however, that the skilled reader comes to a word that he has never seen before, like dossal, cunctation, or latescent, or an unfamiliar proper name like Vukmanovich or Sbarra. Though the skilled reader can hardly be said to "recognize" a word he has never seen before, he nevertheless recognizes elements of it--letters, and patterns of letters, that give him reasonably good cues as to how the word should be pronounced. Dossal may be recognized as similar to fossil and pronounced to rhyme with it, the first letter cuing the "/d/" sound. Cunctation may give a little more difficulty but be recognized as somewhat similar to punctuation and, at the same time, to *mutation*; by following the total pattern of cues the reader may be able to infer the correct pronunciation. *Latescent* will probably be recognized not as a compound of *late* and *scent*, but as a member of a family of words like *quiescent*, *fluorescent*, etc. Somewhat the same principles apply to the reading of foreign proper names; even if he is not familiar with the foreign language involved, the skilled reader will be sensitive to the possible values of the letters and letter-combinations in the name, and come up with a reasonable pronunciation.

It should be noted that thus far we have been speaking of the recognition of words as particular combinations of letters. Actually, in English there are numerous instances of homographs--words that are pronounced in different ways depending on their use. The word READ is an interesting example: in the context *to read* it rhymes with *bead*, but in the context *to have read*, it rhymes with *bed*. The skilled reader instantaneously interprets the word in its proper "reading" or pronunciation depending upon the context--i.e., the surrounding words and their meanings.

This takes us, in fact, to the next stage of our analysis of the reading process. As you take in material recognized in the succession of rapid fixations that is characteristic of skilled reading, it somehow merges in such a way as to build up in your mind an impression of a meaningful message--a message that is, in many ways, analogous to the message you would apprehend if someone read the paragraph aloud to you, with all its proper inflections and accents. Some people report that as they read they can "hear" (in the form of internal auditory images) the message as it might be spoken; at least they report that they "hear" snatches of such a message. Other readers feel that they apprehend a meaning from the printed message directly; that is, without the intervention of any auditory images. In slow readers, or even in skilled readers reading very difficult material, one may notice slight articulatory movements that suggest that the reader is trying to pronounce the words subvocally.

The process of scanning a paragraph for a meaningful message does not, of course, always run smoothly. As one reads, there may be momentary lapses of attention (which can be due to lack of interest, distractions, or even stimulation from the content itself), or of comprehension (which can be due to the difficulty of the material, poor writing, or other conditions). The process of comprehension seems to have some influence on the movements of the eyes: when the reader fails to attend or comprehend, his eyes may "regress"--moving back to fixate on a portion of the material already scanned. Difficulties in recognizing particular words may cause the eyes to dwell on or around a particular point in the text longer than the usual amount of time. There are large differences among individuals in all the reading processes we have mentioned. Some read with markedly fewer fixations per line; some read with an abnormally high number of fixations per line and exhibit many more regressions than normal.

Few individuals have the same pattern of eye movements, even when they read at approximately the same speed. Obviously, there are wide individual differences in rate and accuracy of comprehension.

The essential skill in reading is getting meaning from a printed or written message. In many ways this is similar to getting meaning from a spoken message; but there are differences, because the cues are different. Spoken messages contain cues that are not evident in printed messages, and conversely. In either case, understanding language is itself a tremendous feat, when one thinks about it. When you get the meaning of a verbal message, you have not only recognized the words themselves, you have interpreted the words in their particular grammatical functions, and you have somehow apprehended the general grammatical patterning of each sentence. You have unconsciously recognized what words or phrases constitute the subjects and predicates of the sentence, what words or phrases modify those subjects or predicates, and so on. In addition, you have given a "semantic" interpretation of the sentence, assigning meanings to the key words in the sentence. For example, in reading the sentence, "He understood that he was coming tonight," you would know to whom each "he" refers, and you would interpret the word "understood" as meaning "had been caused to believe" rather than "comprehended." Somehow you put all these things together in order to understand the plain sense of what the message says.

Even beyond getting the simple meaning of the material you are reading, you are probably reacting to it in numerous ways. You may be trying to evaluate it for its truth, validity, significance, or importance. You may be checking it against your own experience or knowledge. You may find that it is reminding you of previous thoughts or experiences, or you may be starting to think about its implications for your future actions. You may be making inferences or drawing conclusions from what you read that go far beyond what is explicitly stated in the text. In doing any or all of these things, you are "reasoning" or "thinking." Nobody can tell you exactly what to think; much of your thinking will be dependent upon your particular background and experience. At the same time, some thinking is logical and justified by the facts and ideas one reads, while other kinds of thinking are illogical and not adequately justified by the facts and ideas one reads. One aspect of a mature reader's skill consists of his being able to think about what he reads in a logical and well-informed way. This aspect of reading skill sometimes takes years to attain.

We have described the process of reading in the skilled reader--a process that is obviously very complex. How is this process learned or attained?

As in the case of any skill, reading skill is not learned all at once. It takes a considerable amount of time. Furthermore, the process of learning to read is not simply a "slow-motion" imitation of the mature reading process. It has numerous components, and each component has to be learned and practiced.

There are probably a great many ways to attain reading skill, depending upon the order in which the various components are learned and mastered. It may be the case that some ways are always better than others. On the other hand, children differ in their aptitudes, talents, and inclinations so much that it may also be the case that a particular way of learning is better for one child while another way is better for another child. It all depends upon which components of reading skill a given child finds easier to learn at a given stage of his development. In referring to different orders in which component skills would be learned, we do not mean to imply a lock-step procedure in which the child first learns and masters one skill, then goes on to learn and master another skill, and so on. Actually, a child can be learning a number of skills simultaneously, but will reach mastery of them at different periods in his development. From the standpoint of the teacher, this means that different skills may need to be emphasized at different periods, depending upon the characteristics of the individual child. This is particularly true in the case of the child who is having difficulty in learning to read.

Let us try to specify the components of reading skill. Some of these components come out of our analysis of the mature reading process; others out of a further analysis of these components.

1. The child must know the language that he is going to learn to read. Normally, this means that the child can speak and understand the language, at least to a certain level of skill, before he starts to learn to read, because the purpose of reading is to help him get messages from print that are similar to the messages he can already understand if they are spoken. But language learning is a lifelong process, and normally there are many aspects of language that the individual learns solely or mainly through reading. And speaking and understanding the language is not an absolute prerequisite for beginning to learn to read; there are cases on record of children who learn to read before they can speak, and of course many deaf children learn the language only through learning to read. Foreign-born children sometimes learn English mainly through reading. Children who, before they begin to read, do not know the language, or who only understand but do not speak, will very likely require a mode of instruction specially adapted to them.

2. The child must learn to dissect spoken words into component sounds. In order to be able to use the alphabetic principle by which English words are spelled, he must be able to recognize the separate sounds composing a word and the temporal order in which they are spoken —the consonants and vowels that compose spoken words. This does not

mean that he must acquire a precise knowledge of phonetics, but it does mean that he must recognize those aspects of speech sound that are likely to be represented in spelling. For example, in hearing the word "straight," the child must be able to decompose the sounds into the sequence /s, t, r, ey, t/.

3. The child must learn to recognize and discriminate the letters of the alphabet in their various forms (capitals, lower case letters, printed, and cursive). (He should also know the names and alphabetic ordering of the letters.) This skill is required if the child is to make progress in finding correspondences between letters and sounds.

4. The child must learn the left-to-right principle by which words are spelled and put in order in continuous text. This is, as we have noted, a very general principle, although there are certain aspects of letter-sound correspondences that violate the principle; e.g., the reverse order of "wh" in representing the sound cluster /hw/.

5. The child must learn that there are patterns of highly probable correspondence between letters and sounds, and he must learn those patterns of correspondence that will help him to recognize words that he already knows in his spoken language or that will help him to determine the pronunciation of unfamiliar words. There are few if any letters in English orthography that always have the same sound values; nevertheless, spellings tend to give good clues to the pronunciation of words. Often a letter will have highly predictable sound values if it is considered in conjunction with surrounding letters. Partly through direct instruction and partly through a little-understood process of inference, the normal child can fairly readily acquire the ability to respond to these complex patterns of letter-sound correspondence.

6. The child must learn to recognize printed words from whatever cues he can use--their total configuration, the letters composing them, the sounds represented by those letters, and/or the meanings suggested by the context. By "recognition" we mean not only becoming aware that he has seen the word before, but also knowing the pronunciation of the word. This skill is one of the most essential in the reading process, because it yields for the reader the equivalent of a speech signal.

7. The child must learn that printed words are signals for spoken words and that they have meanings analogous to those of spoken words. While "decoding" a printed message into its spoken equivalent, the child must be able to apprehend the meaning of the total message in the same way that he would apprehend the meaning of the corresponding spoken message. As in the case of adult reading, the "spoken equivalent" may be apprehended solely internally, although it is usual, in early reading efforts, to expect the child to be able to read aloud, at first with much hesitation but later with fluency and expression.

8. The child must learn to reason and think about what he reads, within the limits of his talent and experience.

It will be noticed that each of these eight components of learning to read is somehow involved in the adult reading process--knowing the language, dissecting spoken words into component sounds, and so forth. Adult reading is skilled only because all of the eight components are so highly practiced that they merge, as it were, into one unified performance. The well-coordinated, swift eye movements of the adult reader are a result, not a cause, of good reading; the child does not have to be taught eye movements and, therefore, we have not listed eye coordination as a component skill. Rather, skilled eye movements represent the highest form of the skill we have listed as (4) --the learning of the left-to-right principle. The instantaneous word recognition ability of the mature reader is the highest form of the skill we have listed as (6) --recognition of printed words from whatever cues are available; and usually this skill in turn depends upon the mastery of some of the other skills, in particular (5) --learning patterns of correspondence between letters and sounds. The ability of the adult reader to apprehend meaning quickly is an advanced form of skill (7), and his ability to think about what he reads is an advanced form of skill (8).

The "great debate" about how reading should be taught is really a debate about the order in which the child should be started on the road toward learning each of the skills. Few will question that mature reading involves all eight skills; the only question is which skills should be introduced and mastered first. Many points of view are possible. On the one hand there are those who believe that the skills should be introduced in approximately the order in which they have been listed; this is the view of those who believe that there should be an early emphasis on the "decoding" of print into sound via letter-sound relations. On the other hand, there are those who believe that the skills should be introduced approximately in the following order:

(1) The child should learn the language he is going to read.

(6) The child should learn to recognize printed words from whatever cues he can use initially, but only from total configurations.

(7) The child should learn that printed words are signals for spoken words, and that meanings can be apprehended from these printed words.

(8) The child must learn to reason and think about what he reads.

(4) The child should learn the left-to-right principle, but initially only as it applies to complete words in continuous text.

(3) The child should learn to recognize and discriminate the letters of the alphabet.

(2) The child should learn to dissect spoken words into component sounds.

(5) The child should learn patterns of correspondence between letters and sounds, to help him in the advanced phases of skill (6).

This latter view is held by those who argue that there should be an early emphasis on getting the meaning from print, and that the child should advance as quickly as possible toward the word-recognition and meaning-apprehension capacities of the mature reader. Skills (2), (3), and (5) are introduced only after the child has achieved considerable progress towards mastery of skills (4), (6), (7), and (8).

These are the two main views about the process of teaching reading. If each one is taken quite strictly and seriously, there can be very clear differences in the kinds of instructional materials and procedures that are used. It is beyond our scope to discuss whether the two methods differ in effectiveness. We would emphasize, rather, that methods may differ in effectiveness from child to child. Furthermore, it is possible to construct other reasonable orders in which the various components of reading skill can be introduced to the child. There is currently a tendency to interlace the approaches distinguished above in such a way that the child can attain rapid sight recognition of words at the same time that he is learning letter-sound correspondences that will help him "attack" words that he does not already know.

For the child who is having difficulty in learning to read, it may be necessary to determine exactly which skills are causing the most difficulty. The "dyslexic" child may be "hung up" on the acquisition of just one or two skills. For example, he may be having particular trouble with skill (3),--the recognition and discrimination of the letters of the alphabet, or with skill (2),--the dissection of spoken words into component sounds. On determining what skills pose obstacles for a particular child, it is usually necessary to give special attention to those skills while capitalizing on those skills which are easier for the child to master.

UNCERTAINTIES AND RESEARCH PROBLEMS

The above description of the nature of the reading process is based on the findings of nearly three-quarters of a century of research. A good deal is known about reading behavior, yet there are many questions that have not been answered with precision and certainty. We shall list the most important of these.

Questions about the mature reading process.

1. How does the individual's ability to recognize words "instantaneously" develop? What cues for word recognition are most important? How and when does awareness of spelling clues and "inner speech" representation recede, if it does? What is the extent of the "sight vocabulary" of the mature reader? (It should be noted that most studies of word recognition processes have been conducted with adults; there is need for developmental studies in which word recognition processes would be investigated over different chronological age levels.)

2. How do skilled readers process unfamiliar words? To what extent, and how, do they use patterns of letter-sound correspondence?

3. How do skilled readers find the proper "readings" of homographs and other types of ambiguous words?

4. What are the detailed psychological processes by which skilled readers comprehend the simple meaning of what they read? In what way do lexico-semantic, syntactical, and typographical factors interact to yield this comprehension?

5. How are eye movements controlled by comprehension processes, and how does the individual develop skill in scanning print?

6. How does the mature reader acquire skill in reasoning and inferential processes?

7. What are the major sources of individual differences in rate and accuracy of comprehension in mature readers?

Questions about certain components of reading skill as they affect learning.

1. In what way does knowledge of the spoken language interact with learning to read? What kinds and amounts of competence are desirable before the child undertakes any given task in learning to read?

2. What is the nature of the ability to discriminate sounds in the spoken language and to "dissect" words in terms of these sounds? How does it develop, and what role does it play in the beginning reader's learning of letter-sound correspondences? How can this ability be taught?

3. How do children learn to recognize and discriminate alphabetic letters in their various forms? When children have difficulty with letter recognition, how can these difficulties be overcome?

4. How do children learn the left-to-right principle in orthography (both as applied to individual words, and to the order of words in continuous text)? Are there children with special difficulties in learning this component of reading skill?

5. Exactly what are the most useful and functional patterns of letter-sound correspondence in English orthography, and in what order should they be learned? How, indeed, are they learned? Is it better to give direct instruction in them, or is it better to rely upon the child's capacity to infer these patterns from the experience he acquires as he learns to read? Should the characteristics of particular children be taken into account in deciding this?

6. When a child has acquired the ability to recognize words and read them in order, yet does not appear to comprehend the message as he would if it were spoken to him, what is the nature of the difficulty?

Questions about the ordering of the components of reading skill in the teaching process.

1. In what way are the various skills prerequisite for each other? What aspects of each skill are necessary to facilitate progress in another skill?

2. Is there one best order in which to introduce the components of reading skill in the learning process, or are there different orders depending upon characteristics of individual children or groups of children? If so, how can these individual or group characteristics be determined?

3. On the assumption that there is an optimal ordering of skills for any given child, how much mastery of a given skill is desirable before another skill is introduced?

BASES OF CLASSIFICATION OF READING DISORDERS

G. E. Blom and A. Jones

In reviewing twenty-four references on classification of dyslexia and related reading disorders, there appear to be a number of methods used:

1. Functional methods -- these vary from discrete descriptions of altered reading behaviors (microscopic) to groups of such behaviors within larger entities of function (macroscopic).
2. Etiologic methods -- these vary from relatively specific causes to more global, larger groupings of causes. Some classifications are a mixture of functional behaviors and causative factors.
3. According to a theoretical model, such as psychoanalytic ego psychology (Pearson, 19), "structure of intellect" (Guilford, 10), psycholinguistics (Kirk, 14), communication-language (Blair, 3), and neurophysiology (Buktenica, 4).
4. As a nosological system -- this is based on the premise that some characteristics of reading disability can appropriately assume the form of a disease classification.

These various methods are presented with illustrative examples.

Classifications According to Reading Functions

Such classifications are most often used by remedial reading teachers or by classroom teachers in a less intensive fashion. They are both microscopic (i.e. discrete descriptions of altered reading behaviors) and macroscopic (i.e. the reading behaviors are grouped within larger entities of function).

One functional classification system focuses on descriptive reading behaviors. It is particularly useful to classroom and remedial teachers, since one or more of these symptoms can usually be observed in students with reading disabilities.

Descriptive reading behaviors can be found in the writings of Johnson (12), Myklebust (17), Valett (24), Stuart (22). A composite behavioral symptomatology of reading disorders follows:

A. Oral Reading Behavior

1. Confusion in letter, syllable and word recognition
2. Reversals of letters and syllables
3. Loses place easily
4. Confusion of similar verbal and/or visual configuration
5. Many errors in omissions, additions, substitutions, and transpositions
6. Poor use of word-attack skills
7. Perseveration of beginning sounds
8. Lacks fluency
9. Points to words
10. Moves head
11. Poor concentration
12. Lacks interest, poor motivation
13. Words and phrases lack meaning
14. Tense, can't sit still, over-active

B. Silent Reading Behavior

1. Loses place easily
2. Points to words
3. Moves head
4. Erractic eye movements, fixations, and tracking
5. Lip movement
6. Subvocalization (whispering)
7. Poor concentration
8. Can't sit still, over-active

A second classification system of descriptive behaviors outlines four functional groups.

A. Perceptual, Cognitive, and Motor Behavior

1. Deficiencies in visual competencies:

    a. seeing
    b. visual memory
    c. visual sequencing
    d. visual recall
    e. visual discrimination
    f. visual-motor coordination
    g. figure-ground discrimination
    h. form constancy

2. Deficiencies in auditory competencies:

    a. hearing
    b. auditory memory
    c. auditory sequencing
    d. auditory recall
    e. auditory discrimination
    f. perseveration of beginning sounds
    g. listening
    h. auditory-visual transposition

3. Deficiencies in tactile competencies:

    a. touch sensitivity
    b. tactile discrimination

4. Deficiencies in kinesthetic competencies:

    a. feeling, sense of muscular motion, position
    b. speech articulation (motor feeling)
    c. hand writing
    d. reproduction of forms

5. Deficiencies in speech and language competencies:

    a. irregular speech development
    b. slow speech development
    c. speech impediments
    d. verbal fluency
    e. blending and/or synthesizing sound
    f. inner language transformations

6. Deficiencies in spatial competencies:

    a. position in space
    b. spatial relationships of objects
    c. directional orientation
    d. orientation for right-left, up-down, in front of-behind, and over-under

7. Deficiencies in temporal competencies:

    a. rhythm sequence
    b. synchrony
    c. orientation to clock time
    d. orientation to calendar time

8. Deficiencies in memory imagery:
    a. concrete (direct learning)
    b. visual (abstract, symbolic)

B. Social and Emotional Behavior

1. Low frustration tolerance
2. Asocial (poor interpersonal relationships)
3. Emotional lability
4. Poor motivation
5. Withdrawn
6. Easily discouraged
7. Poor self-concept
8. Inappropriate behavior
9. Depressed
10. Low energy level
11. Failure syndrome
12. Short attention span

C. Physical and Motor Behavior

1. Balance
2. Posture
3. Locomotion
4. Fine and gross motor coordination
5. Clumsiness
6. Ambidexterity
7. Mirror writing
8. Impulsive reaction
9. Hyperactivity
10. Distractability
11. Confused laterality
12. Confused body awareness

D. Conceptual Behavior

1. Poor memory, particularly for symbolic representation
2. Poor association of meaning with symbols
3. Unique patterns of conceptualization

Monroe (16) groups disturbances in reading behaviors in the following way. It is to be noted that some of the groups are etiologic and therefore this classification system is a mixture of functional and etiologic.

A. Difficulties related to visual aspects of reading

1. Lack of accurate vision
2. Lack of visual discrimination
3. Lack of precision of discrimination of spatial orientation

B. Difficulties related to auditory aspects of reading

1. Lack of auditory acuity
2. Lack of precision in discrimination of speech sounds
3. Lack of precision in the discrimination of temporal sequence

C. Difficulties related to the motor aspects of reading

1. Lack of precision in motor control of eyes
2. Lack of motor control of speech
3. Lack of precision in directional motor responses

D. Difficulties related to the conceptual aspects of reading

1. Lack of vocabulary
2. Lack of facility in the organization of language

E. Difficulties related to methodological aspects of reading

1. Overstress of speed of reading
2. Overstress of some methods of word-recognition

F. Difficulties related to environmental aspects of reading

1. Foreign language
2. Illiterate parents
3. Truancy and poor school attendance
4. Frequent moves from school to school
5. Number of siblings
6. Ordinal position of child
7. Others

G. Difficulties related to emotional aspects of reading

1. Attentional instability
2. Resistance to reading
3. Fear, timidity, embarrassment
4. Withdrawal
5. Others

Classifications According to Etiology

Classification systems within this group also vary considerably from global to specific.

Eisenberg (6) considers a provisional classification according to the sources of reading retardation.

A. Sociopsychological sources

   1. Quantitative and qualitative defects in teaching
   2. Deficiencies in cognitive stimulation
   3. Deficiencies in motivation

      a. associated with social pathology
      b. associated with psychopathology (emotion)

B. Psychophysiological sources

   1. General ability
   2. Sensory defects
   3. Intellectual defects
   4. Brain injury
   5. Specific (idiopathic) reading disability

Keeney and Keeney (13) propose a comprehensive and detailed classification system where the term "dyslexia" is used as well as the synonyms. Larger groupings are used with detailed specific causes listed under them.

A. Specific (primary), developmental dyslexia (strephosymbolia; dyssymbolia)

B. Secondary dyslexias (symptomatic; secondary reading retardations)

   1. Secondary to organic brain pathology

      a. Brain damage (cerebral dysfunction; other encephalopathy; cerebral palsy; mental retardation; low I.Q.; perceptual disorders; word blindness; visual agnosia; anomia, soft neurologic stigma)

         (1) Genetic
         (2) Post-traumatic

            (a) Prenatal
            (b) Natal
            (c) Postnatal

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(3) Postinflammatory (intrauterine; extrauterine)

(a) Encephalitic
(b) Meningitic

(4) Asphyxic (hypoxic) (intrauterine; extrauterine)

(a) Placenta previa
(b) Cord strangulation
(c) Maternal circulatory collapse
(d) Excessive maternal narcosis; drugs
(e) Circulatory collapse; cardiac arrest; cerebrovascular accidents

(5) Prematurity

(6) Other specific brain lesions (aneurysm; cyst; etc.)

2. Secondary to slow maturation (late bloomer; developmental delay) (associated with impaired lateralization and dominance)

3. Secondary to emotional disturbances

a. Hyperactivity; short concentration span
b. Depression
c. Anxiety

4. Secondary to uncontrolled seizure states

5. Secondary to environmental disturbances

a. Cultural deprivation
b. Poor motivation (extrinsic or intrinsic)
c. Poor instruction

C. Slow readers (handicapped without symbolic confusion), bradylexia

1. Asthenopia; visual handicaps (hyperopia; heterophoria; astigmatism; binocular control abnormalities)
2. Auditory impairments
3. Hypothyroid states

D. Acquired dyslexia (lesions of dominant hemisphere, angular gyrus, and splenium)

E. Mixed types

Hermann (11) uses a classification system of reading disorders according to Fog's framework (7). There are four main headings under which the causes of disease can be classified.

A. Reaction preparedness - constitutional

1. Intelligence
2. Personality structure
3. Degree of maturity in relation to school adjustment

B. Environmental factors, referring to long-term influences

1. Playmates
2. Siblings
3. Parents - home
4. Social milieu
5. School milieu

C. Precipitating factors, referring to debilitating factors

1. Physical disease
2. Neglect of schooling
3. Change in schooling, etc.

D. Specific factors, i.e. the special factor which is unconditionally necessary for the disease to occur.

1. Hereditary determination

Perhaps one of the most commonly used etiologic classification systems is that proposed by Rabinovitch (20), as cited by Keeney and Keeney (13). There are two groups of reading retardation: primary and secondary. The secondary group is reactive to other pathology or problems, be they neurologic or psychosocial. This classification system approaches a nosology.

A. Primary reading retardation - developmental dyslexia

Capacity to learn to read is impaired without definite brain damage suggested in the history or on neurologic examination. The defect is in the ability to deal with letters and words as symbols, with resultant diminished ability to integrate the meaningfulness of written material. The problem appears to reflect a basic, disturbed pattern of neurologic organization. Because this etiology is biologic or endogenous, these cases are diagnosed as primary reading retardations (developmental dyslexia).

B. Secondary reading retardation - reactive to other pathology or problem

1. Brain injury

Capacity to learn to read is impaired by frank brain damage manifested by clear-cut neurologic deficits. The picture is similar to the early described adult dyslexic syndromes. Other definite aphasic difficulties are generally present. History usually reveals the cause of the brain injury, common agents being prenatal toxicity, birth trauma or anoxia, encephalitis, and head injury. These cases are diagnosed as reading retardations secondary to brain injury.

2. Exogenous factors

Capacity to learn to read is intact but is utilized insufficiently for the child to achieve a reading level appropriate to his mental age. The causative factor is exogenous, the child having a normal reading potential that has been impaired by negativism, anxiety, schooling opportunity, or other external influence. These cases are diagnosed as reading retardations secondary to exogenous factors.

Classifications by Theoretical Models

Pearson (19) presents a classification system of learning difficulties from the viewpoint of psychoanalytic ego psychology. This involves learning functions broader than reading. This consists of:

A. Diminished capacity to learn due to organic disorders

1. Differences in intelligence
2. Physical defects or illness

B. Diminished capacity to learn due to improper or unpleasant conditioning experiences

C. Diminished capacity to learn due to disturbed current object relations

D. Diminished capacity to learn due to deflection of attention

1. Engrossing conscious apprehensions of dangers to the child's security

2. Engrossing conscious feelings of guilt, shame, embarrassment as the sign of fear of real detection and punishment or of superego disapproval
3. Engrossing conscious feelings of horror and fear
4. Engrossing conscious involvement with instinctual desires
5. Focusing of attention on daydreams

E. Diminished capacity to learn because the learning process itself is involved in a neurotic conflict

   1. Disorders of the use of learning

      a. As an expression of sibling rivalry
      b. Because of feelings of guilt or dread of castration

         (1) Examination anxiety
         (2) Repudiation because learning is associated with masculinity or femininity
         (3) Inhibition to avoid guilt and fear of castration

   2. Disorder in the function of taking in knowledge

   3. Disturbances in the assimilation and digestion of knowledge

F. Diminished capacity to learn because of a disturbance in relation to reality

G. Diminished capacity to learn because the child has never learned to tolerate the anxiety produced by the lack of gratification of instinctual drives

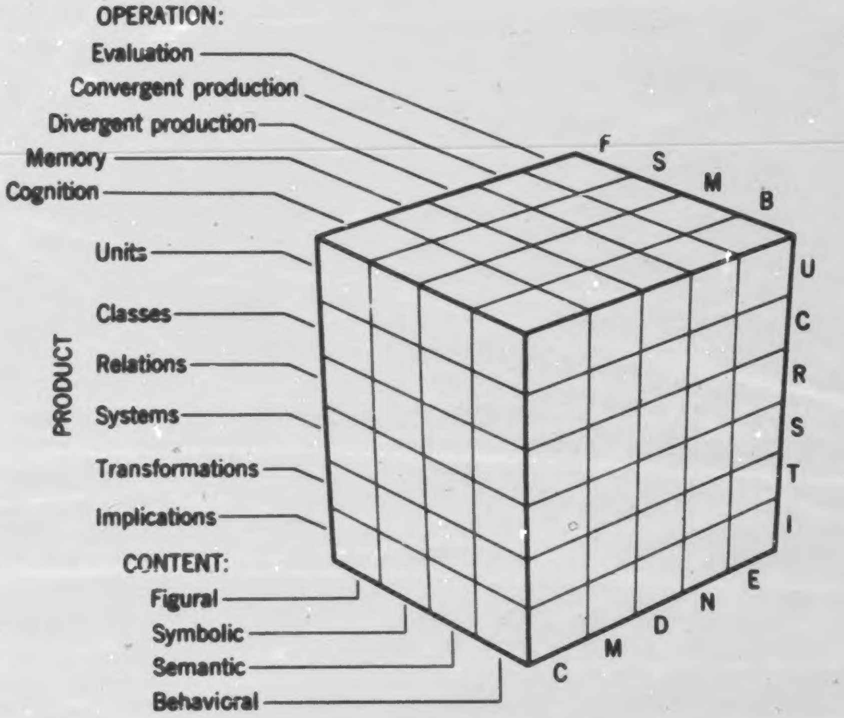
Components of Guilford's "structure of intellect" model (10) which are significant for analysis of reading disorders are:

Cognitive Component	Clinical Diagnosis
1. Cognition of visual-figural systems	Visual agnosia (apperceptive)
2. Cognition of visual-figural units	Visual agnosia (associational)
3. Cognition of visual-symbolic units	Inability to recognize words
4. Cognition of semantic units	Inability to recognize word meanings
5. Cognition of auditory-figural units	Word deafness: inability to recognize that certain sounds are language symbols

Guilford, J. P. (10)

Structure-of-Intellect Model

This orthogonal, three-dimensional taxonomy of 120 elements or "factors" of intelligence is the graphic presentation of Guilford's model. Each element of this cube is a hypothesized factor, 82 of which have been empirically confirmed.



(From "The Nature of Human Intelligence" by J. P. Guilford. McGraw-Hill, New York 1967. Used with permission of McGraw-Hill Book Company.)

Kirk (14) has developed a classification of areas where reading disorders may occur, based on the Illinois Test of Psycholinguistic Abilities.

A. Representational Level

    1. Decoding
       Auditory
       Visual

    2. Association
       Auditory Vocal
       Visual Motor

    3. Encoding
       Vocal
       Motor

B. Automatic - Sequential

    1. Automatic
       Auditory Vocal

    2. Sequential
       Auditory Vocal
       Visual Motor

Blair (3) proposes a classification system based on a theoretical model of psycholinguistic factors relevant to language acquisition and utilization.

A. Reception (Input)

    1. Sensory Experiences
       (Psychophysical Sensitivity and Primary Discrimination)

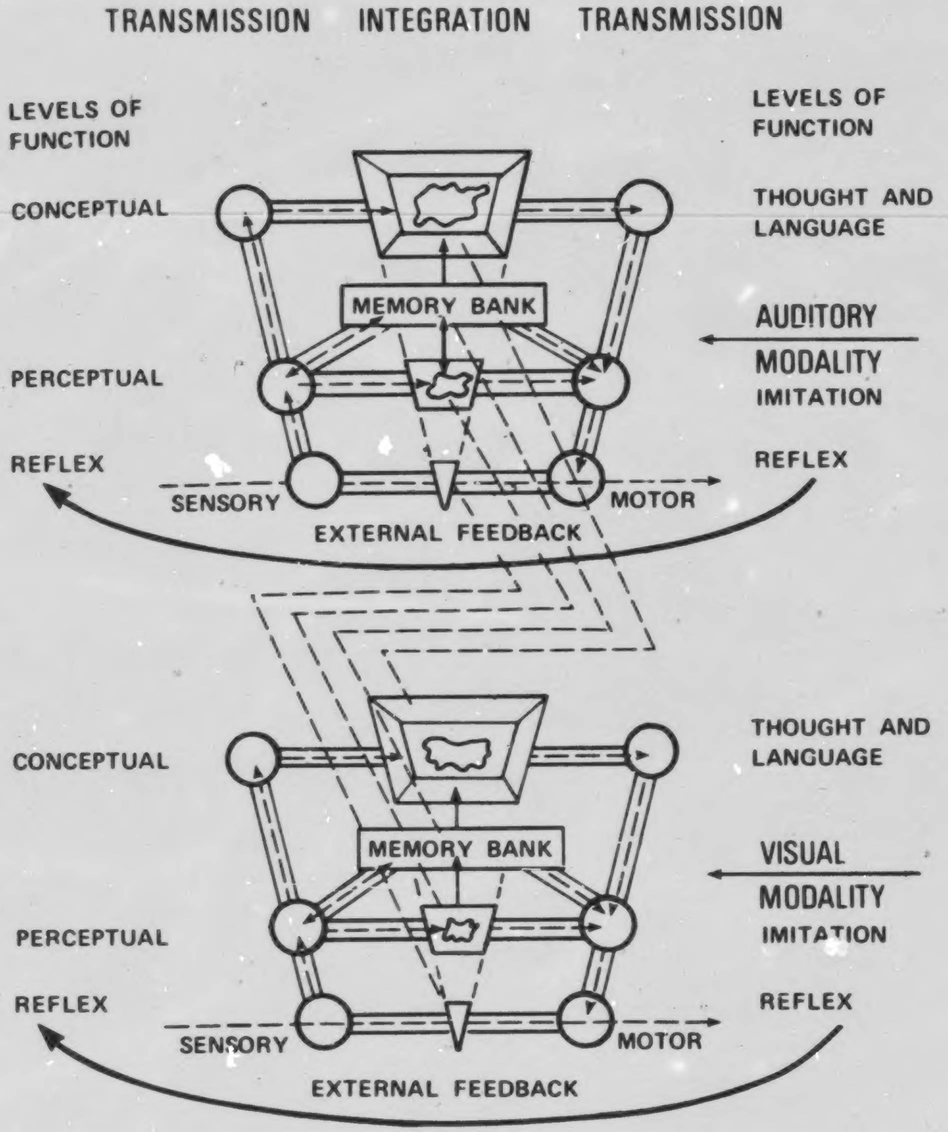
    2. Perceptual Organization
       Observance
       (Attention Readiness)
       Selection Attention
       (Figure Ground Choice)
       Recognition
       (Secondary Discrimination)
       Temporal - Spatial Sequencing

B. Expression (Output)

    1. Linguistic Response
       Vocal Speech
       Writing
       Gesture

2. Peripheral Motor Integration
3. Central Motor Integration
   (Temporal Projection of Symbol and System in the Coordinating Mechanisms)
4. Language Formulation
   Symbol Recall
   System Recall (Syntax)

Buktenica (4) has developed a schematic representation of auditory and visual perceptual modes as they are transmitted and integrated within the central nervous system for various levels of functional response.



Classification According to Nosology

As indicated previously Rabinovitch's classification system (20) approaches a nosology. This has been modified and elaborated upon by others. The authors' compilation example follows:

A. Primary: developmental dyslexia

Various factors are considered:

1. Inherited reaction preparedness to specific factors
2. Congenital condition - genetic determination
3. Gerstmann's syndrome
4. Unique EEG patterns
5. Unusual sex incidence

B. Secondary: dyslexia due to pathological conditions

1. Neurological deficits
2. Sensory deficits
3. Brain injury
4. Intellectual deficits - Oligophrenia
5. Visual dyslexia
6. Auditory dyslexia
7. Visual-audio processing
8. Perceptual disorders
9. Memory
10. Disorders of cognition
11. Nervous system maturational lag
12. Psychoneurological problems in inner and receptive language
13. Visual rivalry
14. Cerebral dominance
15. Minimal brain dysfunction
16. Inadequate directional notion
17. Primitive concepts of corporeal awareness - body image
18. Disordered temporal concepts
19. Disordered spatial concepts
20. Mental retardation
21. Speech difficulties
22. Audimutism
23. Organic brain pathology
24. Hypothyroid states
25. Hyperkinesis
26. Uncontrolled seizure states
27. Left-right directional confusion
28. Poor auditory sequencing

C. Secondary: dyslexia due to other problems

1. Emotional problems
2. Social problems
3. Psychological problems
4. Inadequate teaching
5. Inadequate motivation
6. Inadequate cognitive stimulation
7. Motor disorders
8. Disorders of abstraction
9. Psychoneurological problems due to disorders of experiences
10. Cultural deprivation
11. Anxiety
12. Psychiatric disturbances

Discussion and Evaluation

Despite the discrepancies in methods of classification of reading disorders, the literature indicates a general recognition of the following: (1) primary (causative-antecedent-etiologic) and secondary (consequential) factors, (2) possible neurological involvement, (3) possible organic dysfunctions, (4) constitutional developmental factors, (5) emotional determinants, and (6) many experiential factors (including inappropriate or inadequate instruction). There is concensus that overlapping and interacting causes are usually present and that single causative factors can seldom be isolated.

Various problems exist in dealing with the issue of classification of reading disorders. First, the traditional focus is on relatively limited though highly important reading behavior functions. In many instances there are other associated concomitant behaviors existing in an individual which may or may not be related to the disturbance in reading functions. These behaviors may reflect more generalized developmental problems, may be consequential to the reading problem, or may be indicative of causal relationships. It is difficult to determine the relative significance of these associated behaviors, and professional disciplines tend to view them according to their own biases, training, and experience.

Second, classification systems used are biased by the professional discipline from which they emanate, by the functions of the setting (research, diagnostic, screening, practitioner, etc.), by the setting in which remedial approaches are used (educational, medical, psychiatric, psychologic, etc.), and by the population groups sampled and served. These biases are demonstrated in the various methods of classification that are employed. Furthermore, the review of the literature indicated a lack of agreement in individual entities, of clarity in the definition of such entities, and of clarity in terminologies. Educational, medical, and behavior terms are used, often inconsistently.

Third, conceptual problems clearly exist in analyzing disordered reading behaviors from the viewpoint of classification. Various concepts can be used for such behaviors: a defect, a deficiency, a disruption, or a difference from the expected. What one observes in the current classification systems are mixtures of these concepts. Another conceptual problem can be defined as functional/competence versus clinical/etiologic. Reading disabilities can be viewed as disordered functional behaviors that can be approached directly by methods of training and remediation not based on etiologic considerations. Rather they are based on a conceptual model of competence/incompetence. Competence training develops skills which replace incompetence behaviors. Careful descriptions of disordered reading behaviors can lead to direct approaches to their modification and correction regardless of etiology. The pursuit of etiology (or etiologies) may not necessarily be beneficial to remedial or corrective approaches or offer specific treatment methods. However, the conceptual problem of functional versus etiologic need not exist as a polar conflict. It is clear that etiologic awareness, without its becoming an exclusive bias, leads to discoveries and, in a number of instances, to corrective measures (e.g., faulty vision or hearing).

A fourth problem can be raised. What should classification serve, i.e., its utility. There are many purposes to classification: (1) for communication, (2) for consistent agreement, (3) for primary, secondary, tertiary prevention, (4) for specific pragmatic remediation or treatment, (5) for understanding causes, (6) for research purposes, (7) for heuristic purposes--new discoveries, new knowledge, and improved conceptualizations. While this is highly idealistic, it is clear that current classification systems for reading disorders do not accomplish these purposes. Some systems communicate within certain professional groups but rarely cut across discipline groups. Definitions are not clear, entities are not agreed upon, and professional biases exist.

There obviously is a need to have a more rational and useful method of classification of reading disorders that approximates the purposes indicated above. A nosological system at this time does not seem possible, warranted, or fruitful. The classification systems based on various theoretical frameworks have a consistency within their own frameworks, but understandably do not encompass many behaviors, environments, and organic equipment which are relevant to reading disorders. Furthermore, they do not lend themselves easily to clinical and remedial applications.

At this time, in our state of knowledge, conviction, and ignorance, it would seem desirable to begin again with a descriptive or behavioral method of classification. From the standpoints of feasibility, communicability, and practicability this makes sense. Since we agree that the major thrust for remediation, prevention, and prediction is in the educational area (though not exclusively) and that the reading problem is an educational one primarily (though not exclusively), then there is cogency and an advantage in using a system of classification that has meaning to teachers. Descriptive reading behaviors, of course, have their antecedents and consequences, but at this time, it is difficult to encompass them in a classification system, though an awareness of them is essential. Descriptive behaviors are and can be further utilized to develop remedial treatment approaches and programs. Much of this is done on a trial-and-error basis rather than on a systematic, evaluative basis.

There is a need to build a more adequate classification system through evaluative research of reading competencies, reading errors, antecedents and consequences, concomitants, and treatment methods. This might take the initial form of typologies which cluster together current behavior characteristics, competencies, antecedent and consequence factors and behaviors, and treatment methods. From such typologies perhaps a more adequate etiologic classification would emerge or perhaps a theoretical framework classification. There is still the issue of whether classification might be approached from the standpoint of a hierarchy of reading competencies or of reading errors (which has been the current emphasis) or a combination of competencies and errors.

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SEX DIFFERENCES IN READING DISABILITY

Gaston E. Blom

Most surveys and clinical studies indicate a considerably higher incidence of reading retardation and reading disability among boys than among girls. This is even more striking among disadvantaged and minority populations. Sex ratios reported by many investigators range from 1.3:1 to 15:1 (See Table I below).

Table I
Sex Differences in Reading Disability

	Boys Girls
Ayres (1909)	1.3:1
Monroe (1932)	5:1
Betts (1934)	2:1
Bennett (1938)	3:1
Olson (1949)	4-9:1
Yedinak (1949)	2:1
deHirsch (1952)	3:1
Hughes (1953)	6-9:1
Miller et al (1957)	2:1
Kanner (1957)	5-15:1
Hermann (1959)	3:1
Berguam (1962)	4-5:1
Bentzen (1963)	2:1
Critchley (1964)	2-5:1
Eisenberg (1966)	2:1

Such findings do not consistently hold in all other countries or cultures although it is difficult to obtain reliable and valid data on this issue. Nevertheless, some data that are available from foreign countries and some data from more recent studies on American children suggest that innate sex-linked physiological variables may be of limited or indirect importance in explaining the phenomenon of sex differences in reading retardation and disability. A variety of psychosocial variables may be of greater salience, including sex differences in child rearing and expectations, instructional methods, teacher and school attitudes and behavior, male attitudes toward school and learning, and also the content of instructional materials (i.e., reading textbooks).

The Nature of the Evidence

Anderson, Hughes, and Dixon (1956) reported that girls tended to read sooner than boys. However, a follow-up study on the same children (1957) indicated no differences between the rates of reading development for the two sexes. Once the children learned to read, the rate of subsequent gain was the same.

Gates (1961) found that in large school samples girls obtained higher reading scores than boys, but that the evidence suggested an environmental rather than a hereditary explanation. Girls pursue a life in which more respect, incentives, and opportunities for reading exist.

In a group of bright children, Anderson, Hughes and Dixon (1957) demonstrated that girls learn to read earlier than boys, but the rate of development following is the same for both sexes. Hughes (1953) also showed that girls were superior in reading through the fourth grade and then no longer after that.

On a small national sample, Clark (1959) demonstrated by testing results that girls were better at spelling in grades three, five, and eight and at the mechanics of language at grades five and eight. Third grade boys were superior in language, mental age, numerical reasoning, and verbal concepts. McGuire (1961) also reported testing results which indicated that at junior high school levels girls were superior at spelling, language achievement, and clerical skills and showed attitudes of accepting school and social standards, of tolerance, and the positive valuing of teachers. Boys showed higher mechanical reasoning ability and displayed attitudes of independence, negative reactions to school and authority, and negative feelings toward teachers.

Stroud and Lindquist (1942) analyzed the results from a state testing program which indicated that in primary school girls excel at language, work study, and reading vocabulary and comprehension. At the high school level there were no differences in reading ability, but girls were superior in language and literature. Boys were superior in general science, physics, contemporary affairs, American history, science, and mathematics.

Again from testing results, Swineford (1948) showed that girls were superior to boys between the ages of ten to fifteen years on reading comprehension.

Maccoby's (1966) study on the development of sex differences indicates that in girls verbal abilities begin earlier and are more advanced. This superiority is also true of grammar, spelling, and perceptual speed. Boys demonstrate more advanced spatial abilities, reasoning, mechanical skills, and science abilities.

Konski (1951) found no significant differences in reading readiness measures between boys and girls; but by the end of the first grade in the same population, girls were found to be superior in reading achievement measures. This suggests an influence from instructional methods and school environment.

These studies on sex differences in academic performance are difficult to evaluate. Many of them are based on unrepresentative populations of children. Some are conflicting in terms of results and interpretations of findings. Test results have their hazards in that they are inadequately standardized and are influenced by a variety of situational factors that are difficult to control. It has also been demonstrated that teachers tend to rate girls higher than boys (Lehman and Witty, 1928). Differences may also exist between test performance and actual or potential abilities.

Edge (1963) has reviewed the literature related to sex differences and reading disabilities covering physiological, psychological, sociocultural, and pedagogical factors.

Physiological Factors

Regarding physiological factors, Baker (1948) suggested differences in visual maturity among beginning readers favoring girls. Eames (1939), however, did not find any sex incidence in eye defects. Huggett (1938) emphasized slower maturation in boys than in girls as a basis for earlier and more advanced language skills in girls. Wilson (1939), however, stressed learning interests and dispositions that favored girls which was probably related to greater physiological maturity. Girls have an earlier readiness for reading such as cognitive attending and better muscular control. Both Smith (1950) and Carroll (1948) found greater readiness for reading in girls than in boys, particularly in terms of visual and auditory discrimination skills. While girls seem to get off to a better start in reading, many studies indicate that boys catch up (Stroud and Lindquist, 1942; Millard, 1940).

Bryant (1962) suggests a more specific neurophysiological factor in reading disability which affects males more frequently. Boys have a greater vulnerability to developmental defects of later injury and to sex-linked or influenced genetic factors. Berguam (1962) believes that boys are more subject to "neural conflict" than girls. Jan-Tausch (1962) believes that girls are more abstract thinkers and hence have greater reading skills, particularly comprehension. Smith and Carrigan (1959) stress metabolic and endocrine factors which influence girls differently from boys. Hamburg and Lunde (1966) suggest that prenatal hormones may have developmental importance in producing sexual differentiation at a later stage in the life cycle even when no hormonal differences can be observed.

Linton (1936) has pointed out that different behaviors in males and females are frequently explained on a physiological basis. This is frequently a rationalization when differences are for the most part the result of culture. Myths about masculinity and femininity are believed and sustained even in the face of evidence to the contrary.

It is difficult to separate the cultural product from its biological base. Sex roles are for the most part highly elaborated cultural products (Dornbusch, 1966).

Sex role behaviors constitute the most significant area of interaction between biological endowments and cultural values in human emotional life. Kohlberg's (1966) approach is that basic sexual attitudes are patterned by the child's cognitive organization of his social world along sex role dimensions and around basic conceptions of his body and his world. Children's sex-role attitudes change with age development similar to his thoughts about the physical world (Piaget, 1952) according to modes of cognition. Kohlberg believes in an interactional theory of instinctual and experiential aspects.

Psychosocial Factors

Maccoby (1966) has reviewed and evaluated the literature on sex differences in intellectual functioning. In terms of verbal ability through the preschool and early school years, girls exceed boys in most aspects of verbal performance. Girls learn to read sooner, and more boys require special training in remedial reading programs. There are differences in perceptual and cognitive strategies and skills between boys and girls. Boys tend to be field independent, analytic, convergent in thinking, and have higher skill in spatial tasks and arithmetic reasoning. Girls tend to be field dependent, global, divergent in thinking, and have higher verbal abilities. Girls obtain higher grades even though boys may test higher in certain subject or skill areas. Certain personality characteristics correlate with better intellectual performance, but these are not always the same for boys and girls. Intellectual performance of boys may be more responsive to environmental events, while that of girls may have a larger component of genetic control.

Maccoby (1966) considers the numerous possible causal factors of sex differences in intellectual abilities: 1) developmental timetable 2) different effects of sex-typed interests, 3) opportunities to learn, 4) identification and modeling, 5) sex-typed personality traits as mediacive processes, and 6) genetic versus environmental contributions.

There appears to be evidence that girls mature faster than boys and one might expect girls to develop some abilities earlier than boys, such as speech and verbal abilities; but other explanatory concepts are probably more powerful. Sex role behavior is established, anticipated, and determined early in life. Do differences also result from different opportunities to learn particular skills or do they result from greater exposure and stimulation to develop such skills? There is some evidence that emotional dependence interferes with certain aspects of intellectual functioning although other aspects are facilitated.

Maccoby considers two personality dimensions which may bear a curvilinear relation to intellectual performance: anxiety and inhibited-passive to bold-impulsive. For example, girls need to be less passive and inhibited and boys less impulsive and bold for optimum intellectual performance.

It is rather striking that most of the psychological and psychiatric studies fail to deal sufficiently with the issue of greater incidence of reading disabilities in boys even though the populations studied are mainly boys.

The Role of School Environments

Waetjen and Grambs (1963) indicate that despite the body of research on the many ways in which boys and girls differ, the school makes no assumptions about sex differences and permits only casually differentiated treatment of students on the basis of sex. They review the evidence for innate biological differences, marked differences in perception, and difference in cultural expectations and clued training. They indicate psychological attributes which may facilitate a girl's advantageous position in learning--greater affiliation need, relating more readily to others, and ease in learning sex role. Already in elementary school, boys and girls are in the process of identifying themselves with their respective roles in society, and this colors their view of the world. Different roads to learning are used by boys and girls, and different academic and cognitive skills also exist. Consistently girls have demonstrated higher language skills than boys. School grades of girls tend to be consistently higher than boys. Sex of the student appears to be important in the assignment of grades. Unfortunately many workers assume that learning is the same for both sexes. According to Waetjen and Grambs, while our culture insists that boys and girls maintain appropriate sex role behaviors, schools are "sex neutral" institutions. There is the expectation that they will behave the same--in deportment, in modes of learning, in curriculum content. These authors pose the possibility that such a paradox may be the basis for underachievement and learning disability particularly in terms of boys. With girls having superior language skills, they further receive rewards in school for such competence. This mitigates against boys who receive less reward and tend to identify language activities as feminine. Waetjen and Grambs make a plea that education be aware of and make provision for sex-linked learning behavior.

Boys are more physically and verbally aggressive, as reported by observational studies of nursery school and kindergarten children (McCandless, Bilous, and Bennett, 1961; Sears, 1951; Siegel, Stolz, Hitchcock and Adamson, 1959), by rating studies (Sears, 1961; Beller, 1962) in a wide age range including teachers' ratings (Feshbach, 1956; Sanford, 1943), by experimental studies (Bandura, Ross and Ross, 1961; Jegard and Walters, 1960), and by projective tests (Sanford, Adkins, Miller and Cobb, 1943) and doll play (Durrett, 1959). Such aggressive behaviors are usually not tolerated within school environments.

According to Minuchin (1964) cultural influences from school result in different performances from boys and girls. McNeil (1964) found that when using programmed instruction in reading boys and girls showed similar progress, but that usual classroom teaching resulted in girls surpassing boys in reading performance. It was also discovered that boys received more negative admonitions than girls and were rated more negatively on motivations and reading readiness. Boys were also given less opportunity to read than girls.

Preston (1961) obtained evidence that fewer German pupils have word recognition difficulties than comparable students in the United States. No sex differences were reported. The differences were attributed to differences in the nature and structure of the language and certain teaching practices and methods.

Wisenthal (1968) has demonstrated that among French-Canadian children, a male teacher, together with male environments and attitudes, and with segregated classes (by sex) there are no differences between boys and girls in reading performance. Lambert (1968) observed similar findings among sex-segregated classes in French-Canadian schools in Montreal. It would be of interest to further test such findings in the public schools of France, where segregated classes exist and where only experimental schools are coeducational. There are many clinical reports supporting the positive influence of male school environments on the academic achievement of boys.

Fitchett (1969) is currently studying the influence of a male, language-oriented, language-arts program on reading achievement of first-grade boys and girls in six first-grade classes. Her hypothesis is that mean reading achievement scores for boys will not be significantly different from girls. The program consists of a language experience approach using the child's own language as a basis for reading instruction. It is further enriched by an in-service education program for teachers, older boys and girls as helpers, many manipulative and construction activities, enrichment books and materials of special interest to boys, male resource people in the community, and other male school personnel.

Another way in which school environments may be programmed differently is based on the studies of Dykstra (1967). His studies evaluated the effectiveness of different methods of reading instruction in first grade. One general finding was that girls tended to have a greater degree of readiness for reading at the beginning of the first grade and tended to read at a higher level at the end of the first grade. In most cases, differences in reading achievement which favored girls at the end of the year disappeared when criterion scores were adjusted for differences in pre-reading ability. A related finding in this investigation was that none of the treatments had a unique effect on the achievement of boys and girls. That is, no significant sex by treatment interactions were found to exist. On the average, girls tended to be better readers in all programs.

Dykstra (1967) believes that first and second grade teachers will have to hold different expectations concerning the reading achievement of boys and girls. On the average, boys cannot be expected to achieve at the same level as girls under current methods of instruction. It is also evident that girls can be expected to be more ready for reading when they enter school. It would be interesting to determine whether or not differences in reading achievement at the end of the first and second grade would cease to exist if boys could be brought to the same level of readiness as girls before they begin reading instruction.

There are many limitations to the findings and conclusions of Dykstra, among which are the many psychosocial variables in addition to instructional methods. He did not consider teacher variables, content of textbook variables, and setting variables. His findings stress the need for differential treatment of boys and girls, which Waetjen and Grambs also stress on a different basis.

The Content of Reading Materials

A number of studies have indicated a lack of awareness of sex differences in reading interests of children in terms of influencing the content of first-grade reading textbooks (Norvell, 1958; Peller, 1958; Edge, 1963; Fdge, 1963). Boys read more science, sports, crime, national news, and adventure stories. Girls read more advertisements and themes about home, school, and children. Many library selection and reading interest studies point to marked differences in the content according to sex.

The studies of Blom, Waite and Zimet (1970) on the content of first-grade reading textbooks commonly used in the United States found that prior to 1962 (publishing date) the content displayed more girl-activity stories than boy activities (statistically significant). Furthermore, boy-activity stories ended in failure as an outcome three times as frequently as did girl-activity stories. After 1962 (publishing date) these findings were not obtained although most of the stories have activities that are rated as of comparable interest to both sexes. Many schools are still using reading textbooks that were published prior to 1962.

Zimet (1968) has shown that in primer content a diffuse sex-role model has been presented in varying and increasing degrees from colonial days to the present. This model was expressed through the portrayal of adult males and females performing similar roles and of boys and girls playing at the same activities. Thus, on the one hand differences between the sexes are minimized in a society that prides itself on its egalitarianism. On the other hand, the culture continues to expect different behavior from the sexes. The sex role model selected for presentation in textbooks has been the diffuse one.

In addition to the consistent pattern of sex role diffusion which appeared from 1600 to 1966, another consistent and complementary pattern appears to evolve. Textbook authors began to increase the number of female characters in the stories as formal education was opened up to girls (between 1776 and 1835). This trend continued, so that by 1898 and up through 1966, girl characters actually outnumbered boy characters in the texts.

A possible explanation for the minimizing of sex differences may be found in the desire to present materials that would be acceptable to a heterogeneous classroom grouping. It remains a curious matter, however, that other alternatives were not attempted. Thus, one might also speculate that the neutral, non-sex-linked male and female behavior described in the stories was an unconscious effort to deny the existence of sexuality in children.

This same explanation may also account for the similar treatment in our culture today of boys and girls under five years old. They are dressed alike, have the same toys and play together at the same activities. By presenting these less mature models of behavior in stories meant to be read by children over five years old, are we not also ignoring the tendency of older children to look down upon behavior which was appropriate the year before?

There was an extremely high frequency of dependency themes in the total sample of books coded, especially in those from 1921 to 1966. This behavior was rewarded overwhelmingly for both sexes and for all age levels, and thus helped to reinforce less mature behavior. A feminizing quality is also present in the positive characterization of a male dependent model, even through dependency is characteristically associated with females.

Since it is primarily from adult models that sex-role behavior is learned, it was important to examine the characterizations of adults in the books to see what standard they were communicating. The child-centered adult model communicates an attitude that the adult exists for the child's pleasure only. The sex-diffuse adult model also presents a very limited view of male and female behavior. Let us assume, however, that the adults are also being assessed by the child reader on the basis of their personality characteristics. Unfortunately, the range was limited here to those of congeniality and affability and also made no distinction between the sexes. Although these examples of behavior were consistent with the egalitarian and nurturant standards and expectations of society, they excluded the sex distinctions and the broad range of behavior manifested by adults in our culture. To this extent, the texts fall far short of fulfilling the role of an acculturation medium.

It is still of interest that there is a large proportion of stories coded "Boy-Girl Activity" in reading textbooks both before and after 1962. Developmental studies demonstrate that by the sixth year most children follow interests that are generally preferred by their sex (Kagan, 1964). Boys are caught up in the pursuits of masculine activities, interests, and identifications. They choose male peers as friends and avoid girls. Girls, too, generally accept feminine interests and personality reaction, though perhaps less strongly than do boys. It is possible that the lack of differentiation in sex roles in the stories conflicts with the important developmental task of sex-role identification. It may be that in their efforts to provide stories that are of interest to both sexes, the authors of these primers have diminished their motivational value for all children. From the standpoint of child development, it would be more consonant to present activities in stories that are clearly differentiated as to sex role. This would mean that in general when girls appear in stories, they would perform girl activities and when boys appear they would engage in boy activities. This would be consistent with the reinforcement that various cultural traditions and activities provide in fostering appropriate sex-role identification.

Such relationships are demonstrated in the analysis of the content of primers. However, a theme category, school, shows twice as many girl-activity stories as boy-activity stories. Although literacy and formal education were masculine prerogatives in the early period of American history, the contemporary association of school with girl activities would appear to be the conventional one. This is an inappropriate value to stress if there is real concern with promoting positive relationships between school and boy-associated activities.

Wiberg and Frost (1970) have studied and compared the content of library books to that presented in first-grade reading textbooks. They also recorded the content of books selected by first-grade children to be taken out of the library. In the checked-out library books, there were differences in content preferences between first-grade boys and girls. Boys selected boy-activity content and theme content of pranks and information, while girls selected pet themes. Girls did not have significant differences in terms of sex or activity.

Developmental research indicates that by the sixth year, most children are following interests generally preferred by their sex. Certain interests, fantasies, and personality reactions typical of either boys or girls are well documented and generally accepted (Kagan, 1964). These differences are thought to result in part from innate factors, but to a larger extent from cultural expectations and reinforcements. Boys have identified with, or are identifying with, their fathers and girls with their mothers. The boy is caught up in the pursuit of masculine activities; his play reflects masculine interests; he chooses male peers for friends, and he avoids close relationships with girls. Primers that depict more feminine than masculine activities could hardly be attractive to boys.

One would speculate that the lack of differentiation in sex roles indicated by this finding conflicts with one of the primary developmental tasks that confront the first-grader--that of specifying, maintaining, and reinforcing his own appropriate sex role. One could argue that a story is useful in inspiring the child to want to read inproportion to the clarity of the presentation of sex role. The primers studied here may have little value in encouraging a child to learn to read, partly because the books attempt to present stories for girls as well as for boys.

From a psychoanalytic viewpoint, the adoption of a stable sex role indicates the resolution of oedipal conflict and the availability of drives for other types of learning. Anastasiow (1965) demonstrated in a sample of children from lower- and upper-middle-class homes that boys with strong masculine values and interests as measured by picture preference, boy preference, and Franky Fable tests have significantly higher reading scores in first grade than boys with median and feminine role scores. Such findings suggest that the content of first-grade stories should emphasize activities that are clearly either masculine or feminine.

Summary

Although reliable and valid information on sex differences in reading disability and retardation are not available, the evidence strongly indicates that there is a far greater incidence in boys. Boys from minority groups (Negroes, Indians, and Spanish-surnamed) are particularly prone to reading disabilities and show poorer academic performance when compared to their girl counterparts. This appears to be so for culturally disadvantaged populations as well. While the higher prevalence of reading disorders in boys is also reported from other countries (England, Sweden), this does not appear to be so for some countries (West Germany, Japan, Polynesia, Bahama Islands). It may very well be that such findings are related to the structure of the language, but there is also evidence that points to psychosocial, instructional, and cultural factors as also being salient. For example, preliminary studies on the content of reading textbooks from other countries demonstrate more appropriate motivational content than is present in American primers. Such content would appear to facilitate reading acquisition in boys.

The contributing factors to sex differences in intellectual abilities and performances are multiple. While physiological factors are important, these can become rationalizations and simple explanations for phenomena that are complex and poorly understood. It is difficult to separate cultural product from its biological base.

It would appear that psychosocial factors influence sex differences in learning. Differences in perceptual and cognitive strategies and skills exist between boys and girls. Personality characteristics correlate with better academic performance, but these are not always the same for boys and girls.

There is growing evidence that school environments are either "sex neutral" or facilitate reading and academic achievement in girls. While intellectual lip service is paid to sex differences in a variety of behaviors, in practice schools tend to be uniform as to instructional methods, curriculum content, and behavioral expectations. While school environments are modified to be more favorable and facilitating to boys, there is evidence that sex differences in academic achievement are not significant.

The contents of reading textbooks also indicate that they present girl activities or boy-girl (sex role ambiguity) activities most commonly. They fail to sufficiently consider the differences in reading interests of children according to sex.

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DYSLEXIA: NEUROLOGICAL AND GENETIC ETIOLOGY

William Brewer

For the purpose of this paper it will be assumed that within the population of poor readers there is a large, homogeneous group whose difficulty in reading is not due to factors such as low IQ, sensory disorder, or cultural deprivation. The individuals making up this hypothetical group will be referred to as "dyslexics." The purpose of this paper is to review and discuss the theories dealing with the cause of dyslexia. Only those theories which assume that dyslexia is due to a deficit within the organism will be covered in this review.

Review of the Literature

Many investigations in this area have taken an indirect approach to the problem of etiology. These researchers have used what might be called "the syndrome approach." They have noted the resemblance of dyslexic children to adult patients with some form of acquired neurological disorder, and they have suggested that there is something common in the acquired and developmental disorders. Some of the theories simply suggest that the etiology must be "organic," while other theories are much more specific.

Most of the early work in dyslexia used the syndrome approach, and in the first decade of research many of the feasible etiological alternatives were proposed. Morgan's (1896) classic, one-page paper was the first published report on dyslexia. In this paper Morgan suggested that dyslexia is related to the neurological disorder of acquired word-blindness in adult patients. He hypothesized that dyslexia was a "congenital" form of word-blindness due to defective development of the left angular gyrus. Thus, the original paper on dyslexia was very specific about the anatomical location of the dysfunction but was relatively vague about the etiology of the disorder, although the use of the term "congenital" suggests that the disorder is not due to disease or brain damage occurring after birth.

In the second reported case of dyslexia, Bastian (1898) suggested that the disorder is due either to a congenital weakness or to brain damage in early childhood. Bastian also pointed out the problems raised for neurological theories by the functional plasticity of the brain in childhood and suggested that the functional plasticity can be used to explain the different degrees of deficit. In mild cases of dyslexia the nondominant hemisphere has taken over the function of the disordered dominant hemisphere, and in severe cases the "visual word centers" in both hemispheres must be disordered.

In a discussion of two additional cases of dyslexia, Hinshelwood (1900) suggested that the disorder could be due to disease, birth injury, or defective development. Thus, by 1900 a number of possible etiologies for dyslexia had been suggested: defective development, birth injury, disease, and childhood brain damage. No evidence favoring one of these alternatives had been presented; and, in fact, the whole weight of the argument for an organic etiology rested on the strength of the analogy between the characteristics of dyslexic children and the neurological syndrome of word-blindness.

Five years later first evidence in favor of a specific etiology was presented. Both Thomas (1905) and Fisher (1905) reported familial occurrences of dyslexia, suggesting that dyslexia may be an hereditary disorder. The reports of Thomas and Fisher were not isolated instances, since they were followed by a large number of similar case reports of the familial occurrence of dyslexia. (See Brewer, 1963, for a review of these studies.)

The theory of dyslexia based on the syndrome of acquired word-blindness remains a viable hypothesis and, in fact, has recently been presented in essentially unmodified form by Geschwind (1962). The major difficulty with this theory is that it is hard to find a way to subject it to some independent test and to differentiate it from other theories. Postmortem data would be of considerable interest. Positive postmortem findings would, of course, be strong evidence for an organic etiology but would not serve to differentiate between various theories of dyslexia, since several theories have suggested the angular gyrus and surrounding regions of the brain as the most likely anatomical location of the dysfunction. Negative postmortem data would be of little use, since it is clearly possible for the brain to be disordered in some fashion that is not detectable through gross or microscopic analysis.

In practice there has been little evidence on this point, since dyslexics are typically young, physically healthy children and thus not likely to come to postmortem during the course of a research study. The only postmortem evidence published in the history of research on the problem of dyslexia appears to have been the case study by Drake (1968). This investigator found bilateral parietal lobe anomalies in a single case; however, it is not clear if this boy was a typical dyslexic, since he showed normal reading achievement on some tests. It is also not clear that the cause of death in this boy was unrelated to the abnormalities discovered.

Orton (1925) noted that dyslexic children made reversals in reading and writing. On the basis of this and other evidence, he proposed that dyslexic children show poorly established cerebral dominance, which results in confusion in the selection of correct memory images during reading. Orton felt that the establishment of cerebral dominance is determined by hereditary factors, and he published a number of pedigrees showing the familial occurrence of dyslexia, stuttering, and ambilaterality (1930). The Orton theory does not involve comparison of dyslexic children with some acquired neurological disorder but instead postulates that there is a disorder of cerebral dominance. This makes Orton's theory somewhat easier to test than many theories in this area because there are a number of possible measures of cerebral dominance. However, in practice it is very difficult to draw any conclusions from the evidence on laterality and dyslexia. Some studies offer strong support for Orton's view, while others give completely negative findings. (See Hallgren,1950; Zangwill, 1962; and Critchley, 1964, for reviews.) Most of these studies have severe methodological defects relating to the selection of dyslexics, the use of an appropriate control group, and the techniques of measuring laterality. Thus, it is not currently possible to draw any conclusions about cerebral dominance in dyslexics from the literature on laterality. However, the use of other measures of cerebral dominance, such as the dichotic listening technique (Kimura, 1961), may resolve this issue in the near future.

Even if there were strong evidence that dyslexic children show poorly established cerebral dominance, the problem of etiology would still not be resolved. Orton suggested an hereditary etiology, but other researchers such as Zangwill (1962) have pointed out that dyslexia and poorly established cerebral dominance could be the result of cerebral damage or some combination of heredity and brain injury.

Hermann (1956, 1959) has suggested that dyslexia may be a congenital form of Gerstmann's syndrome. He reported that dyslexic children show an increased incidence of the four cardinal symptoms of Gerstmann's syndrome--finger agnosia, right-left confusion, agraphia, and acalculia--thus supporting his theory. Hermann presented evidence from other studies to suggest that the congenital Gerstmann's syndrome has an hereditary etiology. Kinsbourne and Warrington (1963) have also suggested that dyslexia may take the form of a developmental Gerstmann's syndrome. However, these researchers found a high incidence of brain damage in the histories of their patients and suggested that the developmental Gerstmann's syndrome could be due to brain damage and to hereditary developmental defect.

There are, however, a number of findings that weigh against the hypothesis of a congenital Gerstmann's syndrome. Benton (1961) and Poeck and Orgass (1966) have presented strong arguments against the classic conception of Gerstmann's syndrome in adults with acquired lesions. A number of investigators have not been successful in finding the Gerstmann syndrome signs in dyslexic children. (See Brewer, 1966, and references cited there.) Recently one of the original investigators of this topic has suggested that the concept of congenital Gerstmann's syndrome has been overemphasized (Warrington, 1967). It appears therefore that the hypothesis of a developmental Gerstmann's syndrome has not been supported by recent work.

Bender (1958) has suggested that dyslexia may be due to a maturational lag in neurological development and language skills. She suggests an hereditary basis for the slow development. This theory has not been explicitly tested but could be, since it predicts that dyslexic children should show delayed developmental milestones over a wide range of neurological and linguistic tasks.

There have been a number of other theories dealing with the problem of dyslexia. Some of these, dealing with perceptual difficulties, perceptual-motor difficulties, and motor difficulties (Frostig, 1965; Getman, 1965; Dunsing and Kephart, 1965) are not yet formulated in clear enough fashion to warrant inclusion. Others (Delacato, 1959; Delacato, 1966) are so speculative that they do not fit in a review of this type.

The work reviewed above has been concerned with etiology only in the context of a broader theory of dyslexia. In addition to work of this type, there has been research more specifically directed at the problem of etiology.

The monograph by Hallgren (1950) on the genetics of dyslexia is probably the most important single piece of research that has been done on the etiology of dyslexia. Selected case histories showing a familial occurrence of dyslexia, such as those discussed earlier, can only be used to suggest hypotheses for more careful investigation. These selected cases cannot be used to find the incidence of the familial occurrence of dyslexia nor to uncover the mechanisms, since the cases were selected for investigation because of the clustering of several affected individuals in one family. Hallgren was trained in the techniques of human genetics and carried out a carefully designed study of dyslexia. He gathered a series of 106 dyslexic children and then investigated the families of each of the children. His analysis of the results suggested that the disorder is inherited and is a simple Mendelian dominant trait. Hallgren's study presents strong evidence in favor of an hereditary etiology for dyslexia, but does suffer from one important flaw. Hallgren based his diagnoses of dyslexia on a subjective combination of test data and interview data and, therefore, it is difficult to know how much confidence to put in his criteria for dyslexia.

Brewer (1963) has carried out a family study which demonstrates the use of object criteria, but the study was limited to a single family and was concerned with disorders of spelling and second-language learning, not dyslexia *per se*.

What is needed in this area is a study of dyslexia employing the techniques of human genetics, as in the Hallgren study, but with

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objective criteria for the occurrence of the disorder, as in the Brewer study. Preliminary reports of several recent studies of the inheritance of dyslexia have been published (Owen, 1968; McGlannan, 1968), but it is not possible to tell if they fill the need expressed above.

Research in the area of brain damage and dyslexia is much like that dealing with hereditary factors, in that the best work consists of a single monograph (Kawi and Pasamanick, 1959). Evidence for brain damage in the etiology of dyslexia before this monograph consisted of selected case histories, which were suggestive but offered little systematic information about the incidence of brain damage in the population of dyslexic children. Kawi and Pasamanick used epidemiological procedures to investigate the problem. They selected a large sample of dyslexic children and compared the hospital records of this group with the records of a control group. There was a significantly higher incidence of prenatal and paranatal abnormalities in the dyslexic group. This finding is strong evidence for brain injury as the cause of dyslexia in some instances. The difficulty with the study is in its interpretation. Is the increased incidence due to a small group of brain-damaged children within the larger group of dyslexic children, or is the increased incidence of abnormalities in the hospital records just an imperfect measure of a brain-damage etiology in a large percentage of the cases. Finally, of course, these findings must be related to the familial evidence. Can two fairly homogeneous dyslexic groups be uncovered or do the two groups overlap?

Implications

On the theoretical side, this review points out the fact that much more research will be required before the causes of dyslexia are well understood. Given the current level of research in this area, it is still possible to question some of the basic assumptions of this paper. Is there a homogeneous group of dyslexic children? Is dyslexia basically due to organic factors (heredity, brain damage) or to environmental factors (emotional problems)? In order to resolve these issues, research in this area needs to shift from case studies and small clinical series to large-scale, methodologically sophisticated programs directed at the important problems.

On the practical side several points should be noted. None of the theories reviewed above imply that children of a certain etiological group cannot learn to read. Thus, an organic etiology should not suggest inaction in terms of treatment. Currently none of the theories in this area are developed in enough detail to imply that a specific technique of teaching reading should be employed. However, this may be one of the most important contributions of this area in the future, since it may well be that certain techniques of teaching reading are more effective with certain etiological subgroups. On a broader scale, knowledge about etiology may suggest programs to prevent or reduce the occurrence of the disorder.

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DYSLEXIA AND ITS REMEDIATION

Jerome Kagan

Reading retardation and complete reading disability are complex syndromes of differing etiologies, with both organic and functional components. Organic etiologies usually spring from primary lesions in cerebral cortex, brain stem, or peripheral afferent and efferent systems serving eye and ear. Functional etiologies derive from anomalous development of motivation, conflict, and expectancy of success. Existing research suggests that organic etiologies probably do not account for more than 15 percent of all cases of reading disability; and among the organic etiologies it is estimated that hypoxic damage to cortex or brain stem centers, as a result of prematurity or traumatic perinatal conditions, is probably responsible for the majority of cognitive deficiencies which produce reading problems (Towbin, 1969).

This memorandum is not concerned primarily with reading deficiencies that are epiphenomena to a more profound mental retardation derived from central nervous system lesions or peripheral sensory defects. Rather, this memorandum is concerned with major psychodynamic bases of reading retardation.

There are at least five different psychological processes that influence the mastery of reading:

1. Inadequate language skills, both in comprehension and expression;
2. Motivation for the extrinsic goals that the tutor (or teacher) commands;
3. Expectancy of success;
4. Identification with the adult models tutoring the child;
5. Impulsive approach to problems with response uncertainty (Kagan, 1969).

Let us consider these processes in more detail.

Inadequate language resources. Some of the most reliable characteristics of poor readers are their poor vocabulary, inadequate language comprehension, and faulty memory for language categories. But poor readers do not always differ from the reading-competent child on non-verbal skills. Reading is characteristically facilitated by the possession of language structures which allow the child to assimilate

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verbal materials. Thus the association between inadequate language mastery and reading deficiency is theoretically reasonable.

Motivation. Reading is a less natural behavior for the human species than talking, and reading skill will not "naturally" develop unless the child has some motive to master this task. Reading is a culturally-artificial skill that requires a more natural motivational base to aid in its acquisition. The primary motives of most American children revolve around desires for:

1. Praise, positive evaluation, and general affection of an adult;

2. Acceptance by peers;

3. Hostility;

4. Dominance;

5. Desire to match behavior to sex role standards;

6. Feeling of self-competence.

A child who does not want the praise of the teacher, or who cannot gratify his hostility to peers through the mastery of reading will be less highly motivated to learn to read than a child with these motives. The ratio of lower to middle class children with reading retardation ranges between 3 to 1 to 6 to 1, depending on the community, because lower-class children are less likely to seek the positive evaluation of adults, less likely to have the opportunity to express hostility to or gain power with their peers through the acquisition of reading, and less likely to define intellectual mastery as an appropriate sex role trait (Kagan, 1969).

Low expectancy of success. It is assumed that there is a curvilinear relation between expectancy of success on a task and motivation to master that task. Motivation is high when expectancy of success is moderate and low when expectancy of success is very low or very high. The child with reading deficiency has inadequate motivation, in part, because his expectancy of success is low. He has not been rewarded for effective intellectual mastery, has not been successful in the past, and after a year or two in the school situation develops a firm belief that he will not be able to acquire reading skills. A rapid deterioration of confidence erodes motivation and promotes withdrawal from the task. As will be seen later, this low expectancy of success may derive from a failure to learn a "sense of effectiveness" during the first two years of life.

Identification. An important determinant of the child's motivation to master skills depends on exposure to an adult who possesses psychological attributes the child desires. Most children value strength, power over others, physical attractiveness, beauty, and competence at varied tasks. In addition, the child admires those adults who are nurturant or potentially capable of nurturance toward him. The child has a strong tendency to imitate the behavior of such adults and to adopt their values. If the child believes that he shares some attributes with the desirable model, he will experience vicarious reactions appropriate to that model; and when these events occur, we say the child is identified with the model. Moreover, the child tends to adopt more attributes, values, and motives of the model because he wants to possess the model's goals. As he increases his basis of perceived similarity with the model, his identification becomes more intense. If the model shows an interest in mastery of reading, the child will make similar efforts in order to increase his identification with that model. The reading-deficient child does not tend to identify with models who value intellectual mastery because he does not perceive much similarity between his attributes and those of the female teacher. Sex role identification is a related and more specific issue. School is perceived by most children as a feminine place because the elementary school classrooms in the opening years of school are usually monitored by women who emphasize feminine values. The child unconsciously decides that the activities of the school are feminine, and consequently the boy's motivation to work at school-related tasks is attenuated (Kagan, 1964).

Impulsivity. Children differ in their tendency to require long or short decision times when faced with a problem that has response uncertainty. Some children respond quickly and often make mistakes; others brood excessively and are usually correct. When the child is learning to read, new words can be viewed as perceptual problems with response uncertainty. Impulsive children make more errors and have more difficulty with the mastery of this skill than reflective children (Kagan, 1965).

These five functional accompaniments of poor reading progress are believed to be major causes of the syndrome.

Let us now turn to some suggestions concerning early cause and possible prevention or remediation. It is believed that recommendations for remediation or prevention depend on the age of the child. It is probable that different interventions will be necessary for the first two years of life in contrast to suggestions for the preschool or early school years. More specifically, intervention into the caretaker-child relation during the first two years of life potentially seems a good idea if we are to solve the problem of reading retardation in lower-class children.

Lower-class children are much more likely to be retarded in reading and general school progress than middle-class children, and class differences in general mental development emerge as early as two years of age. It is reasonable to conclude, therefore, that experiences in the home during the first 24 months are partially responsible for the cognitive profile seen at ages seven or eight. Recent observations of infants in the home situation, as well as in the laboratory, indicate important differences in the experiences of children of different social classes.

The reason for emphasizing socio-economic class as a factor in reading retardation derives from the fact that children born to parents who have less than 12 years of formal education, who are employed in unskilled laboring jobs, and who are living on marginal incomes are most likely to have reading problems in school (Whiteman & Deutsch, 1968). Some middle class children also display reading difficulties, but the rate of occurrence is much lower. The term "social class" in this memorandum is defined by a combination of educational, occupational, and income characteristics. Since the caretaking practices of parents differ dramatically across social class groups, class is usually correlated with the child's intellectual and motivational attributes. Class is used, therefore, as a crude index of categories of experience encountered by the child during the beginning years of life. These experiences can be organized around five dimensions: attachment to the caretaker, learning of effectiveness, distinctive stimulation, exposure to symbolic communications, and reward for mastery.

Attachment to the caretaker. Infants of most vertebrate species are born with a set of behaviors they normally direct toward the biological mother because she is the living organism most often present. Infant monkeys grasp the hairy undersurface of the mother and hold on as she walks; infant ducks follow the mother immediately after hatching. Although human infants can neither grasp nor follow, they can scan, suck, smile, babble, and cling; and the human infant directs these responses at the biological mother. Continual display of these reactions toward the mother leads the infant to become attached to her. If the infant becomes attached to the caretaker during the first year of life, he becomes anxious when she leaves (Ainsworth, 1967). However, as he enters the second year of life, fear of potential disapproval from the caretaker may replace the earlier anxiety over physical separation. Now the child is prone to inhibit those behaviors the mother disapproves and to initiate those she values. The stronger the attachment of infant to mother during the first 12 months of life, the more motivated the child should be to gain the approval of the mother and, subsequently, other adults. Observations indicate that the typical middle-class mother spends dramatically more time in reciprocal playing, talking, and smiling with her infant than does the lower-class mother. As a result, the middle class infant becomes more closely attached to the caretaker and is more receptive to believing in and practicing the caretaker's values.

Documentation of this conclusion is found in the fact that lower-class children are less likely to show separation anxiety during the first year of life than do middle-class children (Kagan, 1968).

Unfortunately, many lower-class mothers believe that there is little they can do to enhance the strength of attachment between infant and caretaker. They feel impotent about their power to influence the child, and they do not enter into long reciprocal periods of play. The middle-class mother plays out the Pygmalion story--shaping and molding the infant to fit her ideal. This act of sculpting leads the mother to engage in mutual interactions that permit the child to develop a strong parental attachment.

The child who establishes a close attachment to the parent during the formative years is more highly motivated to adopt the parent's values and more anxious about parental disapproval. This child is likely to generalize these attitudes to other adults and will be disposed to work for the teacher's approval in the school situation. It is believed that the deficiencies of the lower-class child in reading and other academic skills derive, in part, from his poor motivation to establish a close relationship with the teacher which, in turn, is derived from a weak attachment to the caretaker during the first year of life.

A sense of effectiveness. The middle-class, five-year-old child seems to have a better sense of his potential effectiveness than the lower-class child who often sits withdrawn, announcing his feeling of impotence as an agent who can cause things to happen. This notion is rooted in empirical data. Experiments by John Watson at the University of California reveal that a human infant eight weeks old will show much joy and delight if he can make a mobile turn by moving his head on a pillow. An infant for whom the mobile moves at random, unrelated to the infant's head movements, shows minimal signs of affect when the mobile moves. The belief that one's actions are instrumental in causing changes in the environment--a sense of effectiveness--can be established through parental actions toward the infant. The middle-class mother who responds to her infant's smiling or vocalization by talking or smiling back, is laying the foundation for the belief that the child is a causal agent. The mother who comes to her child when he cries is clearly contributing to the child's faith in his ability to ensure an effective response when he is distressed. It is suggested that the lower-class mother is less likely to enter into interactions with the child that contribute to his sense of causal effectiveness and, as a result, the lower-class child has a lower expectancy of success as he enters the preschool years.

Spontaneous vocalization and speech. Comprehension of language and its effective use require exposure to language during the first three years of life, and lower-class mothers do not speak to their children with the variety, complexity, and specificity that is typical of middle-class mothers. Although television may help the lower-class child acquire new vocabulary items, it is not as effective as direct communication from an adult because the television language is directly related neither to the child's desires nor to his linguistic competence. Careful observations of the mother-infant interaction in middle-class and lower-class homes of infants under one year of age reveal that middle class mothers are more likely to engage in reciprocal, face-to-face, distinctive talking sequences in which the mother is speaking to the child and not providing any distracting stimulations (Kagan, 1968). The lower-class mother often talks as much in the vicinity of her infant, but she may be out of his visual field, changing his diaper, or tickling him. In a recent set of experiments in our laboratory ten-month-old girls listened to tape recordings of meaningful speech or nonsense. The mothers of these children had been observed in the home; and we coded the degree to which they entered into entertainment sequences with them. The children who had long periods of interaction with their mothers were more likely to react differentially to the nonsense and meaningful speech. Language competence and performance are greater for middle than for lower-class children as early as two years of age (Cazden, 1966). These differences are important determinants of differential attention spans of children. We have exposed 13 and 27-month-old children to clay masks representative of male faces. The larger the vocabulary, the longer the child devoted attention to the transformations of the human face. A primary determinant of sustained attention after one year of age is the child's disposition to explain unusual events to himself. The richer the set of language structures to explain discrepant events, the longer the child will maintain attention on the events.

Reward of mastery. There are many subtle infant accomplishments during the first year and a half of life that middle-class mothers notice and praise, but lower-class mothers ignore. Smiling at four months, sensory-motor coordination at five months, standing at eleven months, and walking at fourteen months are reacted to by middle-class mothers with peals of affection. The future investment in mastery of new skills is aided if the child expects such a reaction from his intellectual victories. Middle-class two-year-old children tend to enter into much longer periods of sustained play with toys than do lower-class children. This is due, in part, to a richer set of language resources which allows the child to elaborate more hypotheses, as well as to the expectation that he will complete a product and obtain some response from an adult for this accomplishment.

In sum, the middle-class child's experiences during his first two years make him better prepared to master school tasks because (a) he is more highly motivated to gain the teacher's acceptance, (b) he possesses richer language resources, (c) he views reading as a sex-appropriate task, (d) he is more confident of success and believes in his own potency.

Remediation. It is believed that intervention in the home during the first two years of life, followed by programmed experiences in day care centers during the preschool years, may be an effective pairing of therapeutic procedures. The author opposes placing young infants in day care centers or residential institutions during the first eighteen months of life. First, it is unlikely that these infant nurseries will be able to maintain a satisfactory ratio of caretaker to infant (one caretaker to three infants) in publically-financed nurseries operating ten hours a day, six days a week. Second, it is unrealistic to expect that the caretaking staff of these nurseries, probably working on seven-hour shifts, can maintain sufficient warmth and involvement with the infants for a long period of time. Finally, it is more economical to change the behavior of the primary caretaker than it is to construct and maintain public institutions for infants. The literature on institutional care for orphans or illegitimate infants (see Provence and Lipton, 1962; Skeels, 1966) indicates that these children do not develop social attachments to adults and are retarded in language development. One might assume that institutional care for infants need not be as impersonal and detrimental as it has been in the past if the caretakers would maintain a strong affective involvement and identification with the purpose and population of the nursery. The current psychological mood in the urban centers of the United States, however, is marked by alienation and disengagement, rather than a predisposition to identify with the goals of public institutions. Proponents of institutional care argue that the Israeli kibbutz is an example of the potential effectiveness of institutional care for young children. However, the caretakers in the Israeli setting are strongly identified with the mission and goals of the kibbutz and the nurseries are an integral part of the social structure of this small country. As the kibbutz child matures, he develops strong peer-group relationships and realizes that the kibbutz is a valued component of the society. It is not likely that a publically financed nursery in an urban center would be viewed in this way. Hence, we question the psychological value of this procedure. The author believes that in the United States the biological mother is the single adult who is most receptive to developing an identification with her child. Drs. Ira Gordon (1967) and David Weikart (1969) have each been working directly with mothers, and they have reported several important facts at a recent meeting of the Social Science Research Council. Parents are eager to learn more about the development of their children and are receptive to changes in their usual practices. Both Gordon and Weikart believe that direct tutorial contact with the parents is warmly received and facilitates the young child's development. They suggest that both mother and father should be involved in the intervention procedure and that the intervention agent should possess characteristics that maximize trust in the tutor.

Thus, the sex, color, age, and speech patterns of the intervention agent are critical variables to consider in their selection. Finally, frequent contact with the parent is necessary in order to maintain the parents' motivation and to provide the parent with continual feedback. Weikart and Gordon report relevant anecdotes. One woman who had just been moved into a new housing development did not know how to use the washing machine and was grateful for advice. A second mother did not know what to do when her child cried after feeding or vomiting. Many mothers reported experiencing pleasant surprise when they realized they could influence the psychological reactions of their infants, and they subsequently developed an increased feeling of effectiveness and identification with their infant.

We acknowledge that some mothers must work or wish to work, and the availability of nurseries for these parents is desirable. But many mothers are ambivalent about leaving the infant and would, if they had the choice, remain with their children. It is urged that we train a cadre of staff to contact lower-class mothers soon after the birth of their child and attempt to persuade them of the value of the child-rearing practices discussed earlier. Most lower-class mothers value their infants but do not appreciate the importance of the psychological changes which occur during the first year. These mothers should be instructed in actions that will increase the attachment of infant to mother and increase the sense of the child's effectiveness.

During the preschool years, day care centers should be established whose programs emphasize the training of a reflective, conceptual attitude, language-related skills, perceptual analysis, and expectancy of success in problem situations. The staffing of these institutions should take into account the importance of role models for the child. It is urged that consideration be given to segregation by sex, with adult males working with boys and adult females working with girls. The use of college and high-school students in both preschool and primary school settings is desirable. This strategy has two advantages. First, it would allow each child to have an individualized tutor-child relationship for a few hours each week. Such a relation should maximize the child's motivation to master the academic task and provide the optimal conditions for recruitment of attention and feedback following performance. Second, it would allow many adolescents the opportunity to feel useful and gratify the need, felt by so many of them, to be instrumental in solving some of society's problems. Some communities are informally experimenting with such a plan and report positive results. We must attack the problem of dyslexia at many age levels with different strategies appropriate to the setting and the age of the child. There is every reason to believe we can make young children feel more effective with intellectual tasks and improve their reading and language skills.

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RELATION OF EARLY LANGUAGE DEVELOPMENT TO SUBSEQUENT READING DISORDER

Corrine E. Kass

The relationship between early language difficulties and subsequent reading failure involves prediction and, hopefully, preventive measures. However, accurate prediction without possibility of prevention, may turn out to be merely an "expectation" label in school. For example, a significant correlation between intelligence, as tested with the Stanford-Binet, and school achievement does not automatically provide educational measures for changing either intelligence or achievement, each in turn affecting the other. However, an analysis of the abilities required for achievement and an expansion of the concept of intelligence to include more aspects of language than just the verbal may make prevention of severe reading disabilities more possible than is presently true.

The work on this broader concept of language has begun through a series of theoretical formulations, diagnostic test construction, and correlational research studies. What still remains to be done is the all important prevention aspect; that is, prevention procedures must be tested according to appropriateness for the specific deficit which is to be alleviated, for appropriateness to the age level at which the specific deficit which is the most critical for subsequent learning, and for theoretical fit.

Referents for the above-mentioned language work are the following in order:

1. A psycholinguistic theory of Charles Osgood (1963) suggested three dimensions to language functions: levels, processes, and channels. The levels are (a) representational, (b) integrational, and (c) projection. The representational level refers to comprehension, association, and expression of ideas; the integrational level deals with the automatic and sequential memory aspects of language; and the projection level shows the one-to-one relationship existing between the outside stimulus and the imitation of it.

The processes of language, according to Osgood, are (a) decoding, (b) association, and (c) encoding. Decoding is the ability to understand the meaning of symbols; association is the ability to relate symbols on the basis of their meaning; encoding is the ability to express ideas in symbols.

Channels of language are the sensory means for receiving stimuli. and expressing responses.

Application of Osgood's theory led to the second step in discovering some correlates of severe reading disability (dyslexia).

2. The construction of the Illinois Test of Psycholinguistic Abilities (ITPA) by Kirk and McCarthy (1961), based upon Osgood's theory, made it possible to analyze children's language according to the three dimensions: level, process, and channel. For example, the subtest called "Auditory Reception" is at the representational level, and it measures the child's ability to understand the significance of what is heard.

3. Since the ITPA first appeared, there have been a number of research studies which have examined the psycholinguistic abilities of children with communication disorders (Bateman, 1965). The generally consistent picture which has emerged is that problem readers most often display psycholinguistic disabilities at the integrational or automatic-sequential level of functioning. The specific psycholinguistic correlates of severe reading disabilities which were noted in a study by this writer (Kass, 1962) included the ability to:

a. Use grammar (Grammatic Closure).

b. Reproduce a series of symbols presented visually (Visual Sequencing).

c. Predict a whole from a part (Visual Closure).

d. Blend parts into whole (Sound Blending).

e. Execute a visual prediction manually (Mazes).

f. Reproduce a design from memory (Memory-for-Designs).

g. Note likenesses and differences rapidly (Perceptual Speed).

These results indicate that learning to read involves more than the comprehension of the printed page and includes certain integrative functions which we associate with the skill of reading, or the identification of symbols. When basic deficits are diagnosed in a child with a severe reading problem, specialized remedial techniques can be applied.

Remedial techniques for deficits at the integrational, or automatic-sequential, level of language functioning differ from the methods used for deficits at the representational. For example, a representational level problem may be specifically related to listening comprehension and an integrational level deficit may be specifically related to auditory memory. In the case of the comprehension difficulty, remedial exercises would focus on meaning and thought; however, in the case of the auditory memory deficit, remediation would focus on an automatic process which has no semantic meaning.

The specific technique which appears most useful for achieving a "breakthrough" (the point at which the activity can be performed automatically without error) introduces changes into the child's sensory feedback system. This is accomplished through masking sensory channels differentially, through changing figure-background relationships within the sensory channels, and through the child's self-awareness of the "bad habit," in, for example, auditory memory so that it can be replaced with an efficient automatic process.

A case example of an integrational level deficit in auditory memory follows:

An auditory memory deficit. Auditory memory is the ability to recall letters, words, numbers, or sounds after hearing them. A common disability is in sound blending. A seven-year-old boy at the end of the first grade was referred for tutoring because he could not identify letters of the alphabet. On the ITPA, Billy's lowest score was in auditory-vocal sequencing. Because the child's reaction to failure in reading class at school was negative, a different symbol system was introduced in the tutoring situation. The i.t.a. (Initial Teaching Alphabet) was used as "secret code" between the tutor and the child. Following the successful learning of the first few sounds, the i.t.a. method introduces sound blending. In a matter of three weeks, Billy was pointing out "his symbols" in the newspaper spontaneously and reading simple i.t.a. books.

The "breakthrough" in auditory-memory occurred through auditory training on a few sounds while varying the sensory feedback. For example, one procedure was to have Billy listen to the sound and repeat it immediately, listen to it again, and then walk around the room repeating it. Sometimes Billy was asked to shut his eyes while listening to the sounds.

Prevention and Remediation

Several predictive indices have been developed which appear to be relatively valid. Kindergarten teachers also are fairly accurate in screening children who will present reading problems. Age-related correlates of severe reading disability, however, make it difficult to apply simple prevention measures. Educational treatments must vary according to psycholinguistic deficit and age.

Before prevention can become a reality, more research must be done on remedial procedures appropriate to specific deficits. Research projects in teaching methods usually show a frustrating lack of controlled variables. Also traditional remedial reading procedures have focused on problems not related to dyslexia.

Dyslexia and related reading disorders (usually known as learning disabilities) have been studied and reported in a vast literature. Some specialized techniques have been popularized and exploited. While professionals may decry the panaceas which appeal to parents of children with learning disabilities, these same professionals recognize that there is not yet enough research information for accepting or rejecting most of these methods. The methods which appear to be most effective are prescriptive in nature; that is, they are specific techniques applied to specific deficits.

"Dyslexia" and "Learning Disabilities"

The popularization of the neurological term "dyslexia" has occurred relatively recently. The label has been used primarily by medics. Concomitantly, special educators have been defining a population of handicapped children whose problems have been designated as learning disabilities. The National Advisory Committee to the Bureau of Education for the Handicapped, U.S. Office of Education, has defined these as follows:

> "Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injuries, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps; mental retardation; emotional disturbance; or to environmental disadvantages."

Learning disabilities is a handicapping condition which historically was known as the Strauss syndrome; but since the work of Strauss and others, has become more specifically known as special learning disabilities through a long process of trying out a variety of labels, including minimal brain dysfunction. Special education techniques, too, have been undergoing a long process of refinement in both diagnosis and remediation. The most recent revival of the label dyslexia is a specific example of the dearth of services for the child with a primary psychoneurological deficit(s) in one or more of the learning processes necessary for the acquisition of the communication skills (reading, writing, listening, speaking). The prevalence of children with primary psychoneurological deficits appears to be about four percent of the school

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population (Myklebust, "Progress in Learning Disabilities," Vol. 1, 1968).

Summary

1. There is a population of children which shows specific patterns of learning which seem to be related to difficulty in acquiring skill in dealing with language symbols.

2. The specific deficits shown by this population of children are handicapping conditions which require special education techniques for their amelioration.

3. The label for this population of children has variously been Strauss syndrome, developmental aphasia, minimal brain dysfunction, perceptually handicapped, dyslexia, special learning disabilities. The most relevant for educational purposes is special learning disabilities.

4. Several professions, including special education, psychology, medicine, and speech, are concerned with the problems displayed by these children. For treatment purposes, the most relevant at the present state of knowledge is special educational in nature.

5. Research is primarily needed in the area of educational remediation and secondarily needed in the area of prevention.

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PRESCHOOL INTERVENTION[1]

Katrina de Hirsch

Introduction

Growth requires stimulation. Environmental stimulation is indispensable for the realization of the organism's inherent potential. This is amply demonstrated in the literature. Schilder (1964) found that training plays a significant role even in those functions in which maturation of the central nervous system is of primary importance. Bennet et al. (1964) observed that enriched experience affects brain weight and biochemical activity. White's (1967) investigations testify to the plasticity of early visuo-motor development. They demonstrate, for instance, that the growth of visual attentiveness is significantly affected by environmental stimulation. Infants subjected to certain modifications in rearing developed top-level reaching behavior in 60% of the time required by the control group. Irwin (1960) demonstrated that young working-class children who were read to and shown picture books 15 minutes a day presented significantly higher phoneme frequency at 18 months than did controls. Schaefer (1965) reported that infants who, starting at 14 months, were tutored 5 times a week for one hour and whose verbal development was encouraged through friendly and spontaneous communication with a teaching adult showed increasingly superior performance as compared with others who had not been tutored.*

There is still much to learn about the relationship between developmental and environmental variables, but it is now accepted that developmental processes unfold as a result of the interaction between the neural substratum and environment at the time of the most rapid growth of a function.

This paper discusses the rationale of some current intervention projects and is designed to supply some of the environmental nurture (affective and cognitive) believed to lay the foundation for more formal learning.

Conventional Nursery Schools and Kindergartens

Preschool education is, of course, not a novel institution. However, the conventional nursery school and kindergartens serve largely middle-class children and have traditionally been concerned less with cognitive development than with emotional and social growth. Middle-class children are by and large exposed to rich and varied stimulation in their homes. There is a premium on completing tasks* and on acquiring new skills. Maternal controls are not usually authoritarian--the mother will tend to explain to the child the outcome of his actions, thus engraining the relationship between cause and effect in terms of behavior and the learning of new skills. Hess' (1968) work dealing with the association between social class and the mother's "teaching style" is a beautiful exposition of these phenomena.

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[1] Originally prepared by the author for the Interdisciplinary Committee on Reading Problems, Center for Applied Linguistics.

*For the effects of deprivation of particular input on the development of normal perceptual abilities, see studies by Riesen (1961), Held's thesis (1963). The effects of early enrichment have been analyzed by D'Amato and Jahoda (1962), Hebb (1949).

While a number of middle-class children, for one reason or another, show marked deficiencies in information processing and oral language development, most 4 to 5 year olds have acquired serviceable verbal tools. The needs of these children are primarily social and emotional. Preschool children have a number of tasks to accomplish; they have to solve developmentally early conflicts along the continuum of Anna Freud's (1965) "Developmental Lines." In order to be "free" for learning they have to be able to separate from home, cope with their dependency needs, give up earlier instinctual gratifications, and they must have gone some way towards resolution of the oedipal situation. They must learn to share, to fight and to live with their peers. The conventional nursery school--whether the goal is explicit or not--must, beyond the teaching of skills such as handling the pencil, help them to cope with these tasks. Stories, "pretend" activities, doll play, etc., all assist children in the mastery of early goals and conflicts. Interaction with their peers prepares them for life in the group during the next phase in school.

"Disadvantaged" children share many problems with middle-class children. Admittedly, children from economically deprived backgrounds are not a homogenous group and a too global concept of deprivation tends to confound the issue.** Nevertheless, the majority have specific

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*Social class *is*, however, not the only determinant in terms of task orientation. In an interesting study, Hertzig *et al.* (1968) have shown that even at age three, there are demonstrable differences between American middle-class children and Puerto Rican children of comparable intelligence and similar economic backgrounds. The latter simply are not task oriented; they are given few opportunities to acquire mastery. The emphasis in Puerto Rican households is on social interaction, rather than on performance.

**Horn (1970) states that individuals may be disadvantaged socially, economically, psychologically and linguistically depending on the particular social milieu in which they attempt to function . . . as long as they are unable to realize their potential fully or to enter the mainstream of life in their community.

and pressing needs which differ from those of middle-class children. It is not so much that disadvantaged children lack sensory-motor stimulation--most of them are flooded with an array of stimuli which they are totally unable to sort out. Their often chaotic environment does not help these children to sequence and structure events and experiences; as a result they are bewildered and confused.* Moreover, few efforts are made to orient the children towards long-range goals and towards mastery of specific tasks. There are no rewards for tasks completed or new skills acquired. The pervasive "instinctualization" of the milieu, to use Meers' (1969) words, and lower-class child rearing practices as they are discussed by Marans-Lourie (1967) do not help to curb impulsivity, to delay gratification, or to sustain effort. Still further, the mother's style of communication does not foster linguistic and conceptual development (Bernstein, 1960). The children are action--rather than verbally--oriented and most of them have trouble processing auditory information or expressing more complex feelings and thoughts. Finally, children from such environments are frequently either apathetic or hyperactive. Little is done in the home to help those with organic deficiencies--and such children exist also in the middle class--to reach their inherent potential and to compensate for their deficits (Wortis, 1963). According to Pasamanick and Knobloch (1958), ". . . life experiences and the socio-cultural milieu influence biological and physiological function." Not surprisingly, this "accumulation of deficits" (Deutsch, 1965) results in delayed reading readiness and in massive failure in the early elementary grades.**

The insistent demand for preschool intervention programs which prepare deprived children to cope with the requirements of first grade is a response to their pressing problems. This demand is reinforced by the fierce competition in middle-class urban and suburban schools, competition that has resulted in academic difficulties for a sizeable percentage of even the more privileged segment of the population. The pressure for scholastic performance has led to considerable criticism of conventional nursery school procedures and has resulted in ever-increasing emphasis on programs designed to "guarantee" academic success. Intervention programs specifically designed to provide supplementary training prior to first grade entrance have thus been established in many parts of the country.

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*Pollack (1969) suggests that the middle-class mode of viewing the world in terms of temporal succession is not universal in the American culture and that the lower-class Negro child may receive no reinforcement in his home for sequencing his life.

**Baratz (1970) assumes a radically different position. He maintains that historical and practical factors have resulted in a denial of Negro culture. The assumption underlying intervention is based on deficit models--no matter whether these deficits are viewed as genetically determined or the result of social pathology. He postulates that we deal not with defects but with differences (and attempted to prove it by a linguistic analysis of Negro children's speech). Consequently, a new model must be devised based on cultural differences rather than on deficits "which simply are not there."

The programs discussed in this paper vary widely in their assumptions regarding the causes of learning disabilities, among which reading failure is the most striking.* Some programs focus on social pathology, others are slanted towards emotional and social determinants of learning; few, if any, are concerned with the subtle interactions between organically determined deficiencies and the lack of biological, cultural and affective nurture found in many environments. Some projects favor training for mothers; most concentrate on the child himself. This paper discusses some major approaches**and, in the discussion, examines some of the problems related to early intervention. Head Start and Montessori programs will not be taken up here since they have been extensively discussed elsewhere.

Strategies Involving Health Personnel

Some intervention programs make use of health personnel. Birch (1968) had this to say:

> Recent interest in the effects of social-cultural factors on educational achievement could lead us to

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*Reading failure frequently represents one aspect of a generalized learning disability which may be related to a variety of determinants; genetic factors, intellectual limitations, severe environmental deprivation--both affective and cultural--brain injury or more subtle organic deficits, emotional infantilism, frank psychiatric disturbance. There are, however, intelligent and highly motivated children who fail in reading, although they present no structural damage to the central nervous system, who have excellent ego strength and perform adequately in areas not related to printed and written language. Because reading plays so central a role in the elementary grades, few interventional programs make a distinction between generalized learning and specific reading disabilities. Strategies designed to increase motivation, inhibit impulsivity, delay gratification are geared towards prevention of learning disorders in general, while others which stress visuomotor and oral language training are slanted towards the prevention of reading failure. In the discussion of existing programs, the author has not found it helpful to stress the distinction between the two because they are so often interrelated.

**Specific programs are mentioned only for purposes of illustration and statistical aspects of studies are not discussed.

> neglect certain bio-social factors which through direct influence on the developing child affect his primary characteristics as a learner. . . Conditions of ill health may directly affect the development of the nervous system and eventuate either in patterns of clinically definable malfunctioning in this system or in subclinical conditions. In either case, the potentialities of the child as a learner cannot but be impaired.

Interaction between social conditions and health problems are the rule, not the exception. Fifty percent of children from low income groups have health problems unknown to their parents. A survey in Chicago demonstrated that 5% of children from deprived homes have pica and are likely to carry a lead burden that could become toxic under conditions of stress (Haggerty, 1969). Many more children from poverty areas are admitted to hospitals for "failure to thrive" (Hutcheson et al. 1970), for being underweight or apathetic, or for suffering from iron deficiency anemia which makes them susceptible to infection. In deprived children the consequences of low birthweight are far more severe in terms of later learning deficits than they are in middle-class children. (To begin with the incidence of prematurity is nearly 17% as against 5% in the middle class.)

Birch (1969) points to another important fact: Although a child may not present a serious health problem on a medical examination at the age of three, a number of signs reflecting immaturity or maldevelopment may indicate that the same child may have been "at risk" at a much earlier age. A case in point is malnutrition. In a field study carried out by Craviato et al. (1965) in Guatemala and Mexico, psychological performance--capacity to learn and to process environmental information--was most depressed in children exposed to malnutrition during the first six months of life. Malnutrition, Birch (1970) points out, is not a crisis phenomenon, it is a condition of life.

Programs designed to identify health problems in preschool children and thus to reduce academic failures have been initiated in some communities. For purposes of intervention, however, health problems must be identified very early in the child's life. Hypothyroidism, for instance--reversible only if detected quite early--may stunt intellectual growth. One to three percent of preschool children need glasses. Even slight deficits in auditory sensitivity at the age of maximal linguistic growth, that is to say, between 16 and 36 months, will drastically interfere with children's comprehension and use of language. Amplification at very early ages--medication or surgical intervention in the case of conductive hearing losses--may determine whether a child does or does not function in the early academic grades. Undetected high frequency losses--and they are not easy to identify--may cause the preschool child to be wrongly labeled as withdrawn and are bound to interfere with subsequent reading comprehension. This is not the place to discuss ways in which such badly needed services should be delivered. The point to be emphasized is that for effective intervention we need the earliest possible identification of problems. We need examinations directed to often subtle aspects of the child's functioning which affect his potential as a learner; and we need close coordination between health and educational personnel.

Strategies Involving Parents

Weikert and Lambie (1968) say that preschool programs for disadvantaged children which do not involve mothers are bound to fail. "The problem is not to provide enrichment and opportunities for the children but to restructure mother-child interaction patterns." The removal of the children from their homes to more favorable environments even for long periods of the day does not seem to be the answer.

In an investigation of 284 inner city first-grade children, Goldberg (personal communication, 1970) used Wolf's (1968) Scale for rating educational environment to get some estimate of the relationship between measures of specific parental practices and reading achievement. The association was closer than was the case for that of the usual crude index of socioeconomic status.

In her investigation of the relative contribution of seven maternal variables to the academic performance of urban disadvantaged children, Slaughter (1970) was especially interested in three cognitively stimulating behaviors: concepts used by the mother, individuation of the child's personality, and cognitive controls. Seven maternal attitudes and behaviors accounted for 16% of the variance in the children's intelligence test scores. Among the maternal variables, the cognitively stimulating behaviors mentioned above were more highly correlated with children's achievement than were the remaining ones. Slaughter emphasizes the role of the mother as a teacher. Mothering and teaching, she says, go together; the child needs both if he is to perform up to his maximum capacity in an academic setting.

It is clear from these studies that parental practices and attitudes are extremely important in terms of academic functioning. As a result we see a trend away from child-centered intervention toward work with parents. To acquire linguistic and cognitive skills, to learn to curb impulsivity and to delay gratification--all essential ingredients of learning--children need a model. The model is the person the child is emotionally tied to, that is to say, his mother or some other person who shares his day-by-day life. Thus, enduring positive change in the child's development can be effected by improvement in the quality of life at home and through changes in the people intimately associated with him.

Karnes' (1968) project, for instance, consisted in teaching mothers of four-year olds how to stimulate their children in a variety of ways. In only 12 weeks of two-hour weekly sessions, the children in the experimental group did considerably better than did controls. In one of the most comprehensive preschool projects, Klaus and Gray (1968) emphasized intensive interaction with parents. This resulted in modification of the mothers' attitudes which spilled over into their handling of the older siblings, producing what is called "vertical diffusion." Levenstein (1969) reported on a Verbal Interaction Project which had as its goal the stimulation of communication between mothers and children by encouraging verbally oriented play with toys and books. In this excellent project, social workers "modelled" for mothers the kind of exchange that fosters auditory processing and age-adequate use and comprehension of language.

Wyatt's recent book (1969), "Language Learning and Communication Disorders in Children," vividly describes successful and unsuccessful modes of verbal and affect interaction between mothers and children and might well serve as a guide for interventional programs which enlist the help and participation of mothers.

Modifying their teaching style (Hess and Shipman, 1967) and imparting verbal skills to their children is, however, no easy task for "poverty mothers" who often have been inadequate learners themselves. Swift, in his 1970 paper, described a "mother's storytelling" program designed to teach mothers more effective tools for communication. The participants not only improved their ability to interact verbally with their children, but they began to view themselves as partners in the shaping of their children's development. This, in turn, resulted in modifications of their feelings about themselves.

Strategies Involving Both Parents and Children

The underlying philosophy of earlier work in intervention was based on the assumption that taking children out of an impoverished environment and placing them in an enriched and stimulating one would foster emotional and cognitive growth. It was felt that the longer the time children spent in such environments, the greater the returns.

Results unfortunately were somewhat disappointing. Once children left the program they tended to regress (up to a point this was true also for programs which worked only with parents). Lally (1970) states that it is essential to make changes in the home to help parents cope with the modifications wrought in the child as a result of his experience in an enriched environment. Tannenbaum found drops (1970) in developmental scores in children who have little stimulation in the home once they leave the centers. Schaefer (1969) found that gains made in a child-centered home-visitation project began to disappear once home visitations ceased.

One example of earlier attempts to combine help to both children and parents is the Perry Preschool Project - Ypsilanti, Michigan (1967), which involved two weekly home visits to each family. Tutoring of the child was combined with direct teacher-mother interaction during the tutoring session. The rich and perceptive curriculum was designed to improve perceptual discrimination, conceptual functioning and communicative skills. The program placed the mother in the key role of her child's intellectual development. She became a major participant in the child's intellectual growth. This not only enhanced the child's functioning but resulted in additional benefits such as subtle changes in the mother's handling of her other children.

A recent and multifaceted project is that of Lally (1970) at Syracuse U. Children's Center which combines service and research. Several interlocking projects, some of which started only in September 1969, use large numbers of indigenous paraprofessionals. The goal of each project is to provide for young children and their families experiences which foster maximal cognitive, emotional and social growth. The prenatal project, for instance, starts with the mother before the birth of her child and continues as long as the child and his family are associated with the Center. Another project which includes children from 18 to 42 months is designated the "family style" program since children of varying ages live and work together in a setting which resembles that of the normal family. Preliminary evaluation has shown considerable advantages of this approach over programs which separate children strictly according to age. Some of the questions raised by Lally are: Do children participating in the combined Home-Visit-Center program show less developmental regression than those who participated solely in the activities of the Children's Center or those whose mothers only were helped? What are the advantages to the family of joining the project before the birth of the child as compared to joining it later?

Practically all ongoing interventional programs have one particular feature in common: "Experts" teach parents how to teach their children. It is the expert who imparts information, encourages the parent to encourage task orientation, better verbal communication, improved ability to postpone gratification, etc. All of these are, of course, middle-class goals and it can be assumed that they will assist children to cope better with formal education and to enable them to participate in the mainstream of the culture.

Quite a different strategy is employed by Scheinfeld (1970) who starts out with the parents' own system of values and beliefs and who works from there. In his project carried out in the Martin Luther King Family Center in Chicago, children with poor ego strength were selected from the nursery school and a program was designed for six of the children's mothers, who were interviewed as to their own ideas about child rearing. They were asked which achievements they felt were important for their children and how these might be acquired. In other words, they were encouraged to formulate their ideas as to the basic function of the parental role. They were further asked to set priorities for their goals, and those which coincided with those of the nursery school were selected for work. Participation by the mothers in the activities of the wider community was strongly urged. In the project's last phase, entitled "Working Through the Network," the original six mothers brought to the Center an additional 22 families who in turn became part of the project. Five of the six mothers originally selected made considerable progress. The two who had done best were the ones who most strongly emphasized the importance of a sense of competence for themselves and their children. One of them decided to participate directly in the Nursery program, the other worked as president of the Parents Council. In gaining a feeling of competence in activities which fitted into their own value systems, the mothers enhanced their feelings about themselves and they projected these feelings on to their children. In the process they became more sensitive and responsive to the children's needs.

Scheinfeld formulated the conceptual framework as follows: Parents cannot construe the child's relationship to the world in ways that are fundamentally different from their own. Hence, to change child rearing practices effectively, one must change the parents' own experience.

Strategies Focused on Children

Most interventional projects revolve around the child himself. Some are based on the assumption that learning difficulties stem from a defect, dysfunction or deficit of the organism. Others rest on the conviction that children are destined to fail because--for a variety of reasons--they have missed out on some significant early experience; strategies are devised to provide what the child has presumably missed during his early development. Depending on the researcher's or educator's bias, emphasis may be on perceptuo-motor training, on language stimulation and conceptual development, on specific teaching of techniques considered essential to reading success, or on all of them combined.

In spite of fundamental differences in approaches, interventional strategies such as those discussed by Deutsch (1967), Bereiter (1966), Caldwell (1968), etc., have one feature in common: They deal with the child directly, bypassing the parent.

In the following sections a number of very different strategies are discussed, all of them designed to prepare children for effective participation in the elementary grades.

Neurological Organization

Delacato's (1966) heavily advertised approach, based on his concept of "neurological organization," is not being discussed in detail since Masland and Cratty have taken up its rationale in another section of this publication.

What they have to say about the particular remedial strategies employed in older children applies to younger ones as well. There is no proof that activities such as "patterning" in a tonic reflex position, crawling, creeping, etc., combined with exercises to strengthen the dominant hand and to enforce monocular control "prepare" children for learning. Anderson (1965), who used Delacato's training procedures with kindergarten children, found no significant improvement in reading readiness scores in the experimental group as compared to controls. Stone and Pielstick (1969) found little to support the notion that "neurological training" benefits reading readiness at kindergarten level. The assumption that cortical dominance, important for language performance, can be modified as a result of peripheral manipulation seems to be a gross oversimplification of the highly complex process involved. The reader is referred to an excellent paper by Birch (1970) which discusses both the theoretical framework and the therapeutic claims of the Doman-Delacato position.

1) Large Motor Training

That development is by and large a consistent process which moves from primitive to more highly differentiated organizations has long been accepted [Piaget (1952), Werner (1957), etc.]. Kephart (1960) postulates that motor learning is the cornerstone of this development. Masland and Cratty deal with this proposition as far as it concerns children who already attend school. For preschool children large motor activities such as jumping, jungle gym and trampoline are both enjoyable and beneficial. They help to eliminate postural tensions; they assist in stabilizing the body for performances such as writing; above all, they give children a feeling of power over their bodies which is of importance psychologically.

There are, however, few carefully controlled studies that evaluate the benefits of such training in terms of reading readiness. Rutherford (1965) found significant gains on the Metropolitan Reading Readiness test for boys but not for girls as a result of Kephart oriented training. In the de Hirsch et al. (1966) study there was no association between kindergarten children's performances in hopping, balancing and throwing and their reading performance two years later. Many children with severe motor dysfunctions are excellent readers. Bibance et al. (1969) found that cognitive functions such as reading do not depend on level of motor development.

Kephart maintains that spatial organization--and reading is a pattern laid out in space--derives from children's awareness of parts of their body and the relationship of these parts to one another. Further investigation is needed to determine how far intensive body image training and the engraining of left to right direction in preschool children contribute to reading readiness. (See Chansky and Taylor 1964.)

2) Visuo-Motor and Perceptual Training

Reading, which is fundamentally a high-level cognitive performance, requires an intact perceptual apparatus. "Perceptual Disorders" have thus become equated with reading disabilities and many interventional strategies aim at "preparing" children for reading by working on perceptual and, in particular, on visual perceptual functions.

Basic to this are at least two assumptions:

a) That there is a sequence of hierarchies leading to higher cognitive functions and that "weakness" in one link of this sequence will result in failure to function* at more differentiated levels. This assumption represents a relatively simplistic view of the complex organization of the central nervous system and fails to take into account important mechanisms of compensation. In an interesting study Halpern (1970) describes cognitive compensatory mechanisms used successfully by second-grade children who presented visual-perceptual immaturity. Flavell (1966) maintains that there are alternative developmental paths to achieve a given product and that children may not acquire the same objectives in the same way.

b) That reading is primarily a perceptual rather than a linguistic-cognitive process. While it is true that perceptual clues play a role--particularly in the early stages of reading acquisition--they recede in importance as children get older and rely more and more on contextual and linguistic cues. Ryan and Sommel (1969) say that language processing strategies are utilized by younger as well as by older readers during the actual perception of printed material.

Perceptual strategies have their place, of course. Experiences with shapes, colors, sizes, and textures are the basic stuff of living and severely deprived, institutionalized, and above all brain-injured children may have missed out on early experiences of this kind. They need to learn to reduce irrelevant perceptual information and to filter out non-distinctive features of configurations (Gibson, 1966). Buktenica found that performances on non-verbal auditory and visual perceptual tasks combined account for 37% of the variance in predicting first-grade performance.** However, to quote Stern (1968), the

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*For a discussion of sequential patterning see Flavell and Wohlwill (1969).

**Frostig (1964) identifies difficulties in eye-hand coordination, figure-ground relationships, form constancy, position in space and spatial relationships as implicated in reading and spelling disorders. Olson (1968), in a recent summary of factorial studies, came to the conclusion that the Frostig tests measure a single dimension rather fact "that a set of variables can be shown to co-vary in a dependable relationship in a given set of circumstances does not necessarily mean that modification of one will produce a predictable change in the other." Mann (1968) points out that the coexistence of perceptual deficits with reading disorders cannot be construed as resting on a causal relationship. Both might reflect some underlying condition such as central nervous system dysfunction, or a maturational lag.

The problem of transfer of learning is an old one but it is, nevertheless, crucial in the present context. There is, according to Bateman (1969), no evidence that training in a serial task, such as the stringing of multicolored beads in a given order, facilitates the recall of a sequence of letters. We do not know whether non-verbal perceptual training--in other words, training that does not involve sounds or letters--carries over into reading. Non-verbal perceptual training does improve perception, but does it improve reading readiness? Wingert's (1969) investigation seems to show that this is not the case. The children in his experimental group, improved in visual perception as measured by Frostig's tests, but made no significant gains on the Metropolitan Readiness instrument. Similar findings are reported by Rosen (1968), Jacobs, Wirthlin and Miller (1968) and by Cohen (1969). Jensen (1969) emphasizes the necessity of studying amounts and kinds of transfers on tasks preschool children are able to master. Until we know more about transfer, the sale of packaged perceptual materials offered for "preventive" purposes is premature.

While most normal children have no trouble distinguishing between non-verbal environmental sounds, there are many who have severe difficulties with the perception and discrimination of complex verbal sequences. According to Berry (1969), this performance requires high-order functioning. Kolers (1969) contends that sequences of letters are grouped differently by the nervous system than are sequences of simple geometric forms. Luria (1961) says that the incorporation of verbal symbols into perceptual experiences allows the child to generalize and to stabilize his perceptions. It is at this verbal perceptual level that training seems to be most useful. The tracing, copying, feeling and naming of very large letter forms seems to be more effective than having children copy the Bender Gestalten. Cawley (1968) uses series of speech sounds, graded from simple to complex, to teach auditory discrimination. In both instances verbal symbols are made part of the children's perceptual experiences, which are stabilized in the process.

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than five different ones. Frostig herself is clearly flexible enough to include verbal-visual material--letters and words--and auditory tasks into her training strategies.

It is, of course, true that very different strategies--including non verbal perceptual training--often result in improved attention and more task-oriented behavior on the part of children. One intrinsic benefit of perceptual training, as stressed by Masland (1969) may be the necessity to listen and to process auditory information provided by the teacher's instructions and directions. Little is known about the relative contribution of specific content and more subtle aspects of training such as learning to delay gratification and to invest energy in a distant goal.

3) Oral Language Training

Ontogenetically, mastery of spoken language procedes mastery of its graphic forms. Most normal children have acquired a complex linguistic code by the time they are between 4 and 5 years old. Difficulties with verbal processing, limited vocabulary, paucity of available syntactical options, trouble with relational prepositions, inability to generate linguistic rules (Menyuk, 1969) have all been linked to reading failure. Such linguistic deficits are particularly glaring in disadvantaged children,* but they are also found in middle-class youngsters. Ingram (1968) says that regardless of IQ, the risk of reading difficulties is as high as 75% in children from advantaged homes who at age four are 18 months retarded in speech development. In determining by factor analysis the underlying abilities represented by 20 predictive tests administered to 401 kindergarten children from socially heterogeneous backgrounds, Jansky (1970) found two oral language factors that contributed to reading. The more important of them involved linguistic functioning on both the retrieval and the symbolic level (two verbal auditory tasks contributed to the factor). Such studies and the previous investigations of Deutsch (1967) and many others have resulted in a rapid growth of language-oriented preschool programs differing widely in scope, depth, and sophistication.

A survey of language-oriented projects, the majority of them directed to disadvantaged children, suggests that they can be placed along a continuum with unstructured approaches at one end and highly structured ones at the other. The word "structure" as used in this context refers to an approach which imparts a body of linguistic information in a fairly compact form, leaving little room for essential but non-cognitive aspects of experience.** This continuum refers not only to formal organization but to content as well. The most structured programs are those which focus exclusively on linguistic training, place specific emphasis on cognition, and often include reading and other academic activities in the curriculum.

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*Lawton (1968) says, "Linguistic underachievement is a cumulative deficit, i.e., it is a disadvantage which generates a vicious circle of difficulties increasing in magnitude as school progresses.

**Reference is made here to a monograph on Language Remediation in the Disadvantaged Child, published by Child Development Monographs, edited by M. A. Brottman.

Minuchin's (1968) program probably best illustrates the teaching approach at the unstructured end of the continuum. This type of intervention stresses young children's social, emotional and intellectual growth, which are believed to develop concomitantly. Like the best traditonal nursery schools, her program provides for expansion and enrichment of the child's total world. Teachers offer the children verbal tools that are meaningful in terms of their immediate interests. It has been claimed that this model is unsuitable for deprived children who need a more specific and direct attack on reading readiness tasks. Minuchin herself admits that strategies such as hers require multiple criteria and cannot be adequately evaluated by increases in IQ, vocabulary, etc. Nevertheless, it is likely that her approach significantly contributes to the child's enjoyment of learning, even if this contribution cannot be converted into conventional scores.

The pioneer program of the Institute of Developmental Studies (Deutsch, 1965) represents a compromise. There is a much greater emphasis on pre-reading and cognitive activities than is the case in the traditional nursery set-up, but these activities are carried out in the framework of an enriched environment. The child's experiential background is broadened by visits, field trips, etc.; it is in this setting that training in visual and auditory discrimination and in oral language and concept formation are carried out. One of the outstanding features of this project is the fact that the children are started at nursery school age and carried into the third and fourth grade. This results in better coordination between enriched preschool programs and the school curriculum, in contrast to most other programs which leave children with deficits to the mercy of elementary school teaching methods and fail to make continuing provision for their specific needs.

Intensity and specificity of training are outstanding characteristics at the highly structured end of the continuum. Karnes et al.'s (1968) project, for instance, which has the advantage of a teacher-child ratio of one to five, trains children three times a day for 20 minutes and stresses processes such as categorization and classification by means of games. This project claims significant advances for the experimental children as against losses for controls.

Probably the best known and the most frequently copied model, which teaches standard English as a seccnd language* to disadvantaged

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*Those programs which deal with interventional strategies for children from foreign language backgrounds are not discussed here. The relative advantages of teaching them both in their own language

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children, is that of Bereiter and Englemann at the University of Illinois (1966). The authors conceive of learning disabilities as language deficits and drill the children in the use of English forms. They assume that the language of culturally deprived children is "a basically non-logical mode of expressive behavior which lacks the formal properties necessary for the organization of thought." (This might mean to the children that their own language is an undesirable mode of expression, which in the eyes of most middle-class teachers, it probably is.) Bereiter and Englemann provide highly organized and patterned language instruction combined with the teaching of elementary number concepts and early reading activities. Interspersed between intensive drill periods are language-oriented but not quite as highly structured activities. One of the great advantages of this project is the small teacher-child ratio. There is reason to accept the author's statement that the highly specific reading readiness and number training results in improved performance in first grade. (Follow-up studies are not as yet available.) According to Kohlberg (1968), early decoding and numerical transactions can be promoted by simple discriminations and associations tied to verbal labels; this might account for the success of programs such as Bereiter's. While it is by no means proven that learning a task on an associational level facilitates the learning of the same task on a conceptual plane, associative learning may be useful for coping with early academic demands.

Bereiter and Englemann's strategies, which do not encourage spontaneous verbalizations, have been severely criticized not only because the methods used tend to stifle children's innate curiosity and their drive for autonomy, but also because, as Moskovitz (1968) claims, the authors have taken a simplistic approach to a complex problem and their methodology rests on several erroneous assumptions. One of them concerns the relationship between thought and language; another is their implicit devaluation of non-standard forms of English. Such forms have a structure of their own and do not merely represent a simplified and primitive modification of middle-class English. A final objection to Bereiter and Englemann's methods is their failure to conceive of language as a process of vital communication which needs to take into account the child's affective needs at his particular developmental stage.

Of several studies designed to evaluate the relative efficiency of more or less structured approaches to language enrichment, the

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and in English, as against instructing them at first exclusively in their mother tongue, have not as yet been carefully researched. Reference is here made to Horn's paper (1966). See also "Reading for the Disadvantaged, Problems of Linguistically Different Learners, Thomas D. Horn, editor. Harcourt, Brace and World, 1970.

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most comprehensive one was carried out by Dickie (1968). Her design provided for one traditional enrichment program and a number of more structured ones, such as Bereiter and Englemann's and Gotkin's (1968). All training was carried out in small homogeneous groups. Results showed that all children who had participated in the various projects (both structured and unstructured) did significantly better than did controls. The only significant difference in favor of more structured approaches involved labeling in the group of children who had functioned at the low end of performance on pretesting. French (1969) in an evaluation of two contrasting kindergarten programs, one of them using a rigorous academic readiness training approach, found no significant differences between the experimental and the control group.

Summing up the evidence for linguistically oriented intervention projects, one would have to say that all children benefit from preschool language stimulation and training. Certainly, all disadvantaged children do, and so do those middle-class youngsters whose verbal tools are poor. It is not justifiable, however, to weigh the advantages and disadvantages of specific approaches without taking into account significant variables such as length of program, parent involvement, timing of intervention, and teacher-child ratios. Differences in strategy seem to be less dramatic than one would assume. Structured programs do not have to be rigid and rely on drills, but they often are. They often fail to arouse interest in mastery for its own sake and to foster delight in learning. They may, however, have certain advantages, at least for underprivileged children. One of the most important aspects of learning is the organization of given tasks. It is entirely possible--especially in the case of hyperactive youngsters--that highly structured methods in which it is the teacher who takes over the organization are helpful for those children who have never been taught to approach a task systematically. But the goal--and this is often forgotten--is ultimately to teach children to provide their own organization as they must do in order to achieve at higher levels of learning.

Most teachers prefer structured programs because the participating children tend to pose fewer disciplinary problems than do those enrolled in more loosely organized ones. Parents of disadvantaged children, more than those of middle-class ones, also much prefer highly structured teaching approaches, perhaps because they fit better into their authoritarian ways of control.

The content of linguistic programs presents other problems. It is well documented (Deutsch, 1965) that children from deprived environments make little use of language as a conceptual tool, even if they talk fluently enough. Children who have not developed a basic hierarchy of classification and conceptual organization, children who have trouble with spatial and temporal concepts, are bound to fail in learning (Kass, 1969). Thus, most linguistically oriented programs heavily stress what is called "cognitive enrichment," the assumption being that cognitive processes are furthered by means of verbal mediation.

The development of an abstract language system to which children can turn for the solving of other cognitive tasks is the cornerstone of Blank's (1968) project. Her study is difficult to evaluate because the number of preschool children involved is very small. Those subjects who were tutored four times a week made significant gains over a period of three months, as against minimal gains by the controls, regardless of original level of functioning. The fact that the experimental children were taught in a one-to-one situation may account for at least some of the satisfactory results.

On the other hand,(Kohlberg) 1968 maintains that there exists as yet little evidence to support the notion that language training per se--essential as it is--will result in advanced cognitive structures and enable children to carry out "concrete operations" in Piaget's (1952) sense. He feels that advances resulting from verbal mediation tend to be specific rather than generalized. Learning to attach the generic label "tools" to discreet items such as hammer, nails and saw does not necessarily teach children to discover the essential characteristics and to disregard irrelevant attributes of a different collection of items. Ability to verbalize is not necessarily synonymous with cognitive processing, at least not in the early stages (Flavell and Hill, 1969). Piaget (1954, 1965) does not consider language a sufficient condition for intellectual operations.* The studies of Oleron (1957) and Furth (1966) of deaf children whose performance on classification tests showed the same structure as that of normals and appeared at the same age, corroborate this position. Vygotsky (1962) maintained that children master syntax of speech before they master the syntax of thought and that some time elapses before they learn the mental operations which correspond to the verbal forms they have been using for some time. Kofsky (1967) found that training disadvantaged children in labeling and discriminating stimulus attributes resulted in greater attention to these attributes, but in no greater success in solving conceptual tasks. Activities such as matching, classifying, etc., do not necessarily accelerate cognition.

This does not mean that linguistic training can be dispensed with; on the contrary, it is the cornerstone of intervention. Language does pave the way for eventual high-order intellectual functioning. According to Vygotsky, the syntax of language and the syntax of thought do fuse at later stages. As a result of many years of clinical experience with both middle-class and deprived children, the author is convinced that children are indeed helped to cope with formal instruction in the elementary grades by intensive language stimulation: training in the comprehension and use of relational propositions; teaching of "pretending," that is to say, the shifting of frames of reference; listening to stories; grasping sequences of events; acquiring complex syntactical structures; and working on specific readiness tasks.

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*Sigel (1969) states that the child's correct contextual use of a term is not necessarily indicative of his comprehension of that term, or an accurate reflection of his ability to understand the logical basis of the concept. The same author (1961) found that before the fourth and fifth grade, children could not define the word "brother" in terms of a common relationship.

It is quite possible, as Kohlberg (1968) insists, that the limited increases in Stanford-Binet IQ scores resulting from training are due to attentional and verbal factors rather than to advances in cognition. However, since IQ scores are fairly predictive for success at school, linguistic training is clearly worthwhile. Improvement in attention and better verbal tools amply justify early intervention. On the other hand, it would be most unwise to make claims as to acceleration in cognition resulting from linguistic training as long as the evidence has not been carefully sifted. Exaggerated claims might lead to a repudiation of legitimate preventive measures such as help with oral language and pre-reading training, which are essential ingredients of reading readiness.

4) Packaged Programs

Many interventional projects around the country use a packaged or, what has been called a "shot gun" approach, on the assumption that a wide assortment of activities will benefit children who may have been deprived of meaningful experiences. These projects expose them to large motor, to visuo-motor and perceptual strategies, to training in comprehension and in use of language and to conceptual teaching. In the case of small children who need enrichment and stimulation in a variety of areas this is undoubtedly helpful, although it is, of course, difficult to determine which aspects of such programs are effective. Is it the training of specific functions or do benefits result from reduced impulsivity, and better task orientation? Or is it simply the fact that the program presents the children with an organized universe they have not been exposed to before?

Older preschoolers fare less well with packaged approaches. Many of them, especially those who are "at risk" in terms of subsequent functioning in the elementary grades, need a more specific attack based on an assessment of their individual needs. Only a few programs, such as the one in Bloomington, Indiana (1967), attempt to base interventional strategies on analysis of children's weaknesses and strengths. Exposing older preschoolers who have important deficits in the language area to large motor training results in loss of valuable time which may be badly needed for filling in more critical gaps.

Approaches To Learning

The role of motivation in learning has been discussed for many years. Zigler and Butterfield (1968) believe that the IQ increases so often associated with nursery school experiences are simply the result of poor motivation during pretesting. These authors, and many others, feel that deprived children, more than middle-class ones, suffer from motivational deficits which lower their performance in formal test situations.

The operant model, based on principles of operant conditioning with behavior modification as its central feature (Evans, 1969) is not tied to specific content and appears to be successful in the case of mentally retarded or otherwise handicapped children. (Haring and Whelan, 1965; Hewett, 1968). This approach seems to work in the acquisition of relatively circumscribed skills and isolated behaviors. It seems far less effective when it comes to integrating new cognitive structures. Growth of reasoning cannot easily be interpreted in terms of learning theory.* The principle of operant conditioning has been objected to because of its molecular view of behavior. Moreover, the internalizing of positive attitudes towards learning is not fostered by extrinsic reinforcers.** The question comes up whether a far more encompassing and far more subtle mechanisms--that of identification--is a prerequisite for children to become deeply involved in the learning process. Identification implies a wish on the part of the learner to take on not only single elements but the basic attitudes of a model. It also implies that the behavior learned does not remain a foreign body as it were but that it becomes integrated in the learner's ways of meeting the world. Some disadvantaged school drop-outs who, as a result of their life experiences, have been unable to identify with a nurturing adult model do respond to extrinsic reinforcers. However, we do not know to what extent modifications achieved carry over into new situations as long as they have not become part and parcel of the individual's internalized value system.

The principle of immediate reinforcement plays an important role in the development of programmed instruction, including the use of teaching machines. Apart from immediate rewards for correct responses, this approach organizes the learning task into simplified sequential steps. According to Lumsdaine (1965), programmed instruction "creates an essentially reproducible sequence of instructional events and accepts responsibility for efficiently accomplishing specific change." In an exhaustive paper, Winsberg (1969) came to the conclusion, however, that controlled studies have failed to demonstrate any clear superiority of programmed instruction over traditional classroom methods. While programmed teaching might be useful for improving certain skills--and these skills might well be indispensable--it does not necessarily foster learning which involves the discovering of and the grasping of underlying principles and processes. It is difficult to accept, moreover, that in the case of very young children, and in particular in deprived young children, an approach which eliminates the very thing they most need--the support of an understanding adult they can trust and identify with--would be conducive to learning.

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*In an interesting paper, Flavell and Wohlwill (1969) point out that the Skinnerian learning model which is essentially "linear" reduces the process to the question of whether or not the child has mastered all the steps that precede, and are a prerequisite for, the concept that is to be learned. In this case, the authors say, the concept will not be learned as a general one but as a separate, unrelated entity, and thus will not transfer.

**In a recent paper Pikulski (1970) investigated the effect of three types of reinforcers on children's ability to recognize words. Middle-class kindergarten children made significantly fewer errors when given social reinforcements (praise, smiles) or just knowledge of results. They did a slightly poorer job under material reinforcement and bonus (candy). Lower-class boys did not respond as well to social reinforcement as did girls. There is no evidence to suggest that material reinforcement was in any instance superior to social reinforcement.

The impressive results of tutoring programs differing as widely as Blank and Solomon's (1969) and Palmer's (1968) are probably largely related to identification. Palmer, whose "intellective" training program of 2 and 3-year-old children is one of the most interesting projects, said: "Any well-conceived and structured program may well have equally beneficial results, provided it is introduced early enough in the child's life and an uninterrupted one-to-one relationship between instructor and child occurs . . . over an extended period of time." In a one-to-one relationship attention improves, impulsivity diminishes, anxiety is reduced--perhaps because the teaching adult who has established a warm and supportive relationship with the child "lends" him his own values: a desire to invest effort and pride in successful performance. By identification with such an adult the child slowly learns to incorporate desirable goals (see also Kagan and the psychoanalytical literature).

Timing of Intervention

The problem of the optimal time for starting intervention is an urgent one. The following questions need to be asked: Does early development provide the foundation on which later learning rests? Is severe early deprivation irreversible? Can deprivation be compensated for? Ausubel (1966), Bloom (1964), and Goldfarb (1945) maintain that the quality of early experience crucially affects development and that, as time goes on, it becomes more and more difficult to compensate for early deficits. Hunt (1964) feels that the years following infancy are the ones when adverse environments are most likely to inhibit growth and, specifically, growth of language.

Birch (1969) maintains that learning is not simply a cumulative process and that there is evidence indicating that interference with this process at specific times may result in disturbances of function that are both profound and of long-term significance. It is the correlation of the experiental opportunity with a given stage of development which is crucial. Certain basic skills underlying higher level organization are possibly more easily generalized at earlier than at later ages (Feldmann et al., 1968). In order to clarify the issue, we need detailed phenomenological observations on what happens between infancy and age three. The psychoanalytic school has collected a host of data related to early psycho-sexual development. Studies now being carried out at Harvard (Pines, 1969) are geared more towards behavioral information. We have to learn far more than we know now about the sequence of early physiological, affective and cognitive events and the specific ways they interact.

That lack of sensory-motor and affect stimulation is detrimental to growth was shown by Provence and Lipton (1962). Ability to identify probably develops very early in the child's life. Children who are not fondled and cherished may become apathetic and unable to learn. Between the ages of 10 to 18 months the foundations are laid for comprehension and use of language which depend not only on the neural mechanisms involved but also on the mother's affect and verbal communication with the child and, as time goes on, on her "teaching style."

The feeling today is that intervention cannot start early enough and that, in fact, the time to start is before the birth of the baby. The trained home visitor can assist a pregnant mother to understand her nutritional needs and seek medical and other assistance, if needed. On the basis of a relationship established in this way she can attempt to alleviate feelings of dread and despair related to the impending birth of a child the mother may not have wanted at all, and she may thus facilitate the forming of affect bonds between the mother and her infant--bonds which are essential for the child's physical and psychological survival.

Design and Evaluation of Programs

There have been a number of valid objections to evaluation procedures presently in use. Most programs use changes on the Stanford-Binet and the Illinois Test of Psycholinguistic Abilities (ITPA) scores as their criterion for change. Glick (1966) has pointed out the fallacy of first interpreting performance on intelligence tests as reflecting underlying cognitive structure and then inferring from subsequent scores on these tests that fundamental changes in cognition have taken place.

Cawley (1968) makes the important point that evaluations of interventional projects usually employ univariate means in an area where the problem to be investigated is multivariate. He insists that techniques must be found that evaluate children's progress in the various facets of each program.

Stern (1968) feels that the stated goals of intervention do not always correspond with the terminal behavior which measures change and which is usually the Stanford-Binet or the ITPA. She herself constructed criterion measures designed to evaluate changes in the particular areas covered.

Few criterion measurements evaluate categories such as control of impulsivity, ability to postpone gratification, resolution of dependency needs, etc., although it is likely that some of the gains reported are related to such variables rather than to cognitive and linguistic factors.

Longitudinal studies are needed because in the long run judgment as to progress must be based on long-term results. Some gains might be "washed out," others will show only after some time has elapsed. Subtle changes in the child or in his environment, such as task involvement or enjoyment of mastery, for instance, are unlikely to be reflected on the Stanford-Binet or the ITPA administered only a few months after the original testing.

Zimilies (1968) states that the validity of measurement of outcome is seldom known and when it is known, it is often disappointingly low. In the place of "absolute" evaluations dominated by psychometric techniques, he suggests "operational" evaluations which inquire into the degree to which sub-goals have been affected.

Zimilies, like Flanagan (1970), differentiates between ultimate criterion measures and intermediate ones, the latter being "represented by performances and behaviors which are clearly desirable." Zimilies asks the following questions: Does the proposed form of the intervention maximize the probability of achieving its stated goal? Is the proposed mode of implementation suitable to the objectives sought? Is the statement of goals and proposed operations sufficiently differentiated according to age, developmental level and cultural background of the participating children to guide local practitioners in the development of their program?

Light and Smith (1970) discuss other highly important issues. They maintain that programmers often fail to set priorities for the various goals in single projects--although these goals might occasionally be contradictory. They object to the fact that most projects define benefits in terms of "average gains." However, variations in benefits should also be measured. The authors point out that a careful analysis of the characteristics of groups of children most likely to benefit from certain programs would enable us to direct interventional efforts specifically to certain groups. They also inquire into unintended consequences of programs which might or might not be beneficial. They point to the necessity of replicability. Above all, they want to know which features of a project are controllable and which are not.

In their excellent paper these same authors analyze program designs now in use. They criticize the two most frequently employed post hoc experimental models. In both, evaluation takes place after the results are in. Both attempt to find out whether the average results of the experimental centers are better than those of comparable "non-centers." Among the experimental centers there are some which work well and some which work poorly. The authors counsel against using variability related to results from unsuccessful centers as "benchmarks" to judge successful ones.

According to Light and Smith the relevant question to ask is: Which program works well for reasons known to us and which of them can be reestablished in any future enterprise? It would then be possible to focus on the question whether success is more than accidental and is thus worth replicating.

Their own "sequential" model asks for the setting up of trial centers, a few at a time. Based on incoming information from these centers, it is feasible to estimate which combination of features shows the greatest promise. A second round of centers is then created with program features close to the predicted optimum combination. This cycle is continued until an effective project is attained.

This model requires time, of course, and intervention is so desperately needed that it is difficult to say whether it is worthwhile to try out what seems to be an eminently reasonable approach to the problem. The point made by Light and Smith is simply this: Using sequential evaluations and systematically adjusting and changing strategies according to new insights is far better than throwing together hundreds of stray variations only to reject them after a decade because they have major flaws.

Discussion

The development of effective educational strategies is bound to suffer unless a number of theoretical and practical problems are carefully explored.

1) Are there "critical" phases of development--Vygotsky calls them "sensitive periods"--when training and stimulation are more effective than at other times?

The consensus seems to be (Bloom, 1964; Lenneberg, 1967) that there are phases during which the organism is particularly susceptible to certain kinds of stimulation. Scott (1962) maintains that development can be modified only during periods of maximal growth of sensory, motor, cognitive, motivational and emotional structures. Prior or subsequent to such critical periods, the identical experience may have different consequences or no consequences at all.* It is essential to continue

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*Hunt (1969) maintains that most researchers think of "critical" periods in terms of physiological maturation. He defines it as one

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to explore the "biological timetable" (Penfield and Roberts, 1959) for specific functions. This timetable may vary for specific functions, but Caldwell (1968) argues against the frequent assumption that social and emotional factors have priority during the first three years of life and that cognitive development will take care of itself. Cognitive enrichment, if carried out perceptively and adapted to the child's affective needs, is in no way damaging to his emotional growth. A careful match between developmental level and the particular kind of stimulation offered the child at critical periods seems to be a requisite for success.

2) Do long-range gains result from interventional programs?

Much research is now going on to determine which types of intervention carry over into the school years. Lally (1970) mentions the phenomenon of "developmental regression" as a result of children leaving enrichment programs. He feels that it is only by producing changes in the parents who participate in their children's growth that such regression can be avoided.

The Institute for Developmental Studies has this to say: "The hope for instant enrichment was a vain one. . . . only by sustained, painstaking innovative action can one hope . . . to launch children on careers of fruitful learning." In the case of many children, the elementary school must continue to provide the support and the specific training initiated in interventional programs.

3) How important is the training of specific competences as compared to an expansion of the child's total world?

Training in specific skills and overall enrichment are not incompatible. The answer may in part depend on the child's social background. Structure and organization may be more urgent in deprived than in middle-class children. Drills designed to enhance specific competences, however important they may be, do not necessarily foster enthusiasm for learning, which occurs only in an environment that is responsive to young children's basic needs.

4) What size groups are most suitable for intervention programs?

Mammoth programs seem to be relatively ineffective compared to small-group teaching. According to Holmes (1961), the younger the child the greater the need for small as contrasted to large groups. There is some agreement that the smallest possible teacher-child ratio is most conducive to learning. (Roger Freeman challenges this statement

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during which environmental encounters with a given kind of circumstances are especially effective in the acquisition of a given pattern of behavior.

in the case of school children (1969).) For emotionally deprived children a one-to-one situation seems to be the most promising. The effectiveness of "family-style" centers consisting of children of various ages is currently being explored.

5) Is heavy parent involvement a prerequisite for success?

Wortis et al. (1963) says that many deprived mothers are overwhelmed by feelings of depression and inadequacy. Active participation in their children's progress, will enhance mothers' feelings of being in control, a factor which Hess (1968) found to be a promising predictor of children's subsequent success or failure at school. The all-important role of parent involvement in children's overall development has been stressed by many authors (Bing, 1963; Milner, 1961; Crandall, 1960; Coleman, 1966; Lally, 1970; Scheinfield, 1970).

6) Do middle-class children need linguistic training?

While it is well known that large numbers of deprived children lag in linguistic development, the number of middle-class children whose verbal tools are poor is currently underestimated. Among the 6% to 15% of children who fail in reading, writing and spelling at the end of first and second grade, the large majority presents linguistic deficits related to a variety of causes: genetic, organic, psychological. These children, like deprived ones, need intensive help with the comprehension and use of language.

7) Are our evaluation procedures and program designs satisfactory?

They are not. Ongoing evaluation of programs is much to be preferred to post hoc tests which are dominated by psychometric techniques. The model outlined by Light and Smith (1970) deserves earnest consideration.

Recommendations

There is urgent need for massive interventional programs for culturally deprived children and for those middle-class youngsters who present deficits in areas related not only to the manipulation of numerical and verbal symbols but to learning in general.

Healthy curiosity, urge towards mastery, ability to curb impulsivity and to postpone gratification develop in the matrix of the mother-child relationship as part of the affective and cognitive interaction between the two. It seems naive to expect that the simple fact of entering kindergarten or first grade would change or substantially modify attitudes which have been deeply engrained. Intervention, involving mothers, therefore cannot be instituted early enough.

The development of a trusting relationship between a mother and an indigenous paraprofessional who would visit the home would be based on the latter's availability in terms of the mother's practical everyday needs. This relationship would allow the worker to "model" for the mother ways of handling 8 to 20 month old babies which best promote task orientation and which make for maximal stimulation and growth.*

The Child-Family Center which the child would enter at 20 months would be an organic outgrowth of the earlier home contacts.

The intimate contact of the Center workers with each child and his family would allow them to identify at between 24 and 30 months those children who showed lags in language processing. These particular children would have to be provided with intensive individual help which would be reinforced in the home.

At the beginning of kindergarten, more formal screening procedures (Jansky, 1969) would identify educational "high risks." Subsequent diagnostic evaluations of children so identified would provide profiles of individual pupils' weakness and strength and would make possible the devising of educational strategies tailored to each child's individual needs.

Those children who continued to present deficits at the end of the kindergarten year could then receive help in transition classes (de Hirsch _et al_., 1966) to prepare them better for the demands of first grade.

Continued reevaluation through the elementary grades is recommended.

Since results of research concerned with early intervention are not as yet fully available and since there are not enough trained people to staff these programs, it would be rash at this point to embark on a nationwide assault on early intervention. It is suggested, instead, to use the findings which are just now coming out of existing and newly established projects and embody these features in a new series of operational centers. Such centers would combine service, training and research functions in rural and urban areas involving sociologically widely divergent groups. All projects would continuously feed information into a central agency designed to evaluate strategies used in the different projects. Based on these evaluations, policies could then be formulated for a national program designed to give young children a chance to benefit from educational experience once they enter the elementary grades.

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*Closed TV circuits could be used for a similar purpose.

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PRESCHOOL EDUCATIONAL STRATEGIES AND ISSUES: A REVIEW

Ellis D. Evans

Contemporary interest in early childhood learning and education is unparalleled in the history of our society. Emerging research data on learning processes, the effects of infant stimulation, language development, and behavioral modification are creating among psychologists and educators new ways of thinking about children. The task has just begun, however, for myriad problems have yet to be resolved. Many of these problem areas (assessment procedures, curriculum development, individualized instruction, learning hierarchy analysis, and the relationship between short- and long-term effects of intervention strategies to name a few) apply to all levels of education. These problems are perhaps more dramatic, however, when considered in relation to the preschool years. One reason for this drama is the unquestionably critical nature of this formative period. Another is our relative inexperience with organized early childhood education, the origin of which is surprisingly recent (Frank, 1962).

The purpose of this paper is to examine selectively, and with reference to empirical data wherever possible, the variety of preschool programs for both "normal" children and children with behavioral deficits, procedures for the identification of "high risk" children whose developmental status predicts for them school difficulty, and modifications of the school entry process.

Conventional Approaches

Traditionally, conventional nursery school programs have focused largely upon the noncognitive characteristics of normal preschool children. Activities thought relevant to positive social-emotional growth and creative expression have been paramount. Typically, noncognitive play is the keystone of such programs. Implicit in most are elements of humanistic psychology or psychoanalytic theory, although these psychologies are rarely articulated in a systematic fashion.

Recently the validity of the assumptions involved in using the preschool years for noncognitive play have been challenged. This is particularly true regarding the education of disadvantaged children. Deutsch (1964), for example, has been critical of the fantasy play orientation and protectiveness of the conventional nursery school. The issue is not play versus no play. Rather, it is the relationship among play, emotional development, cognition, and preacademic skill learning. With respect to play functions, Almy (1966) has expressed concern over the relative lack of attention to spontaneous play activities in cognitive-oriented preschool programs. She expresses a longstanding

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conviction, namely, that self-initiated play is an impetus to children's total growth. This conviction finds support in personality theory; for example, Erikson (1963) views the sensitive period for the development of initiative (vs. guilt) as occurring in the late preschool years. Sutton-Smith (1966) has examined evidence which suggests, tentatively, a functional relationship between play, especially children's game activity, and cognitive development. Similarly, Kohlberg (1968) has reviewed cognitive-developmental theories (e.g., Piaget, Uygotsky, Dewey)--their implications for preschool education and intellectual stimulation strategies. It is concluded that the matter of specific forms of stimulation is subordinate to a systematic formulation of activities traditionally associated with the nursery school (e.g., play, aesthetics, social interaction, and construction activities).

The cognitive-affective issue notwithstanding, a key variable in the research on nursery school influences is, as Kohlberg suggests, the degree to which programs are systematic. Swift (1964) clearly indicates that, with a few notable exceptions, research on the effects of conventional nursery school programs, many of which are not systematic, has been inconclusive. In some cases basic principles of learning and development are not integrated into programs. Studies of global effects frequently have failed to relate expected changes (e.g. physical, social, and cognitive) to specific and relevant antecedent variables. Swift (1964) accurately states that the effects of most studies, where effects are observed, depend largely upon the extent to which a program supplements (vs. duplicates) the experiences target children receive elsewhere. "Shotgun" programs generally leave too much to chance factors. Further, programs which deal inadequately with the "problem of the match," described by Hunt (1964), cannot be expected to produce desirable results. It is also likely that some inconclusive results may be traced to inappropriate or questionable measurement techniques. For example, many programs have utilized as criterion behavior gains in intelligence as measured by the Stanford-Binet. One might challenge this very global measure as appropriate for purposes of measuring the influence of a nursery school program designed to enhance children's sensory-motor and aesthetic skills.

Although much of the research evidence is cloudy, it would be hasty to cast a vote of no confidence for conventional programs. Bricker and Lovell (1965), for example, have reviewed the academic and social effects of preschool and kindergarten training. While most studies summarized have dealt with very general behavior variables, several indicate significant and long-term effects. Reading skills, including improved word recognition, comprehension, and reading rate are among the favorable outcomes. The fact remains that variations among programs and the competencies of those who execute them limit the generalizations which can be drawn from past studies. Conventional programs, per se, apparently depend most heavily for their effectiveness upon two factors: individual teacher skill and the socio-emotional climate in which programs are accomplished.

It is probably safe to assume that eclectic, play-oriented preschool programs will continue to flourish. If these programs are to serve a verifiable pre-academic function at least two critical problems must be solved. One involves the provision of sufficient numbers of trained teachers and teacher aides to man these programs. The second problem concerns providing resources for purposes of conducting research on new curricular and methodological variables pertinent to the acquisition of language, reading skills, and positive self-esteem.

The Montessori Method

A remarkable resurgence of interest in Montessorian education has occurred in recent years (Rambusch, 1962). Although originally conceived for the slum children of Rome, the Montessori Method has more generally been the province of privileged children in this country. Distinguished authorities (e.g., Hunt, 1964) wax enthusiastic over the general potential of this method and its concepts have been linked in theory with Piaget's influential genetic psychology.

It is puzzling that, despite decades of existence, research on Montessori is infinitesimal. Few substantive research data exist to demonstrate the superiority of the Montessori model over others. Among the scanty data available are those of Kohlberg (1968). Significant increases in Stanford-Binet performance and decreases in distractibility among disadvantaged Negro children are reported. It is suggested that perhaps the most valuable contribution of a Montessori program is its potential for promoting the development of attentional responses basic to cognitive task learning and performance.

Another recent study (Naumann, 1967), although weak in design, associates reading and spelling gains for children (ages 3 to 5) who spent a full academic year in a Montessori classroom. Data are interpreted to suggest that gains are greater for slow learners than for bright children. A short-term (seven weeks) Montessori program has involved a heterogeneous group of mildly retarded and normal children (Naumann and Parsons, 1965). Generally positive results are interpreted to mean that such children can learn together effectively.

Even more recent are the data of Berger (1969) who has performed a longitudinal comparison of several groups of four-year-old Negro and Puerto Rican children. Subjects engaged in Montessori programs were contrasted with "controls" in pre-kindergarten programs taught by New York State certified kindergarten teachers. End-of-year assessments revealed an advantage in autonomous problem solving and perceptual discrimination skills for Montessori children. No reliable differences attributable to program variables were observed in the children's verbal and memory skills or in their curiosity-exploratory responses. Where differences in the latter dimension were noted, teacher style is interpreted to be the most important variable, with such style not predictably associated with type of program. This phenomenon, incidentally, highlights a major difficulty of research strategies which compare one method or program with another. It is frequently left to speculation whether observed changes, if any, are a function of method variables, teacher characteristics, or some combination of the two.

Several issues are provoked by the Montessori Method. One involves matching the program to children whose needs may be served by it. A second concerns the relationship of Montessori preschool activities to subsequent public school achievement. A third issue is whether all of the elaborate steps which comprise the sequential arrangement of Montessori sensory materials are necessary for efficient academic skill learning. The secondary emphasis given by this method to language training has invoked criticism. An inordinate stress upon convergent outcomes in Montessori programs is a point of contention among those concerned with children's creativity. Although Kohlberg (1968) and Frost (1968) may be consulted for additional analytical comment, the resolution of these issues awaits further research.

Other Programs

Although rare, innovative experimental programs for young children based upon thoroughly articulated theoretical foundations are beginning to emerge. A prime example is the Responsive Environments Project (Moore and Anderson, 1968). Target behavior for initial research and program development has been language acquisition, both spoken and written. Preschoolers of wide-ranging backgrounds and measured abilities have been studied. Accelerated patterns of language learning and reading skill development have been observed. Interestingly, faster rates of progress are noted among children whose speaking-listening abilities and measured intelligence are advanced to begin with. Severe mental retardation excepted, deafness is reported as the most difficult children's handicap with which to deal. Programs such as the Responsive Environments Project warrant particularly thoughtful observation as they represent attempts to build instructional systems in the context of educational technology.

Programs for High-Risk Populations

Cognitive Enrichment. Easily, the most intense efforts of recent years have involved attempts to offset the pattern of cumulative educational retardation characteristic of socially disadvantaged children. Judging by the frequency of such attempts, the most popular approach to the problem of cumulative retardation is the cognitive enrichment strategy. Cognitive enrichment is perhaps most accurately used as an "umbrella" term to encompass a wide variety of programs. Basic to most, however, is the assumption that specific cognitive experiences are requisite to combat language, motivational, and other response deficits typical of children from deprived circumstances.

Generally, intervention programs based upon cognitive enrichment have produced salutary effects (Deutsch and Deutsch, 1968) (Schwartz and Deutsch, 1967) (Klaus and Gray, 1968) (Hodges and Spicker, 1967) (Weikart, 1967). Results, however, appear to be dependent upon a number of variables including length of program, the point in children's development at which a program is initiated, teacher-child ratio, follow-up activities, and parental involvement. Apparent failures of enrichment procedures are usually traced to the influence of one or more of these variables (Alpern, 1966) (Hyman and Kliman, 1967). Selected day care programs based upon enrichment procedures are in progress, yet few definitive data are yet available.

The importance of parental education and involvement in enrichment programs cannot be overstressed. Karnes, et al (1968), for example, report significant cognitive gains for children whose mothers participated in a training program designed to improve maternal teaching skills. Emphasized were teaching techniques pertinent to language learning and problem solving. Control children demonstrated no gains, a finding used by the investigators to validate their education program for parents.

Direct Intensive Instruction. A curriculum model based upon direct instruction and pattern drill has been developed by Bereiter and Englemann (1966). These researchers operate from the postulate that cultural deprivation is, in effect, language deprivation. Therefore, formal language patterns, basic reading skills, and language-based arithmetical skills constitute the core target behavior for this program. Dramatic gains in intelligence and psycholinguistic test performance have been reported for children ages four and five. No control group for purposes of comparison (a common deficiency in much preschool program research) was involved in the original program validation study. Independent replication studies designed to accelerate rate of language development are underway (e.g., Louisville, Kentucky, and Seattle, Washington). Follow-up data on the original B-E children have not been published. Assumptions concerning the relationship between language and thought have been seriously criticized (Moskovitz, 1968), and the expressive language behavior required of children by this method strikes many observers as being highly artificial.

A common response to the B-E program from traditional nursery school people is that it represents a "pressure cooker" approach where little consideration is given to individual children's interests. In short, reservations about this program's pedagogical soundness are warranted. It remains to be seen whether the refinement of language patterns in the direction of standard, formal English actually results in a refinement of thinking skills as the protagonists claim.

In this program's favor, however, are such features as behavioralized objectives, a graduated sequence of instructional materials, and specificity of teaching techniques, all lacking in many conventional approaches. A most serious immediate problem related to the B-E program may be the tendency for uncritical teachers to apply B-E techniques to children other than those deficient in certain language skills. It is difficult to conceive that all children need or would profit from this highly structured program.

The Bereiter-Engelmann program is geared to fast-paced, small-group instruction. In contrast, Blank and Solomon (1968) have attacked the language deficits of the disadvantaged by applying tutorial techniques to individual children. Significant I.Q. gains have been related to the systematic application of these techniques. Hence, irrespective of theoretical underpinnings, systematic approaches focused upon clearly defined target behaviors seem to yield desirable results. Of continuing interest, however, is the extent to which global I.Q. gains may be due to motivational considerations (Zigler and Butterfield, 1968) or the "Hawthorne effect" rather than to basic changes in ability. The apparent and frequently observed "washout" of advantages upon termination of an intervention program (or shortly thereafter) is a provocative phenomenon.

The Operant Model. A system more general in design, i.e., one not tied necessarily to any specific curriculum content, is that based upon the principles of operant conditioning. Behavior modification, an appropriate concern, is the central feature of this system. Among its essential characteristics are such procedures as (1) the careful specification of instructional objectives, (2) the selection and systematic application of reinforcement schedules on a contingency basis, and (3) a graduated sequence of training activities designed to take a child from point of entry to the specified objectives. Operant principles have been utilized successfully in a wide variety of settings and to a wide variety of behaviors. For example, striking response rate changes in children's verbalization, social cooperativeness reading errors, study habits, and other appropriate academic and social behaviors are reported (Birnbrauer, 1966) (Hewett, 1967) (Baer and Wolf, 1968) (Bijou, 1968) (Ullmann and Krasner, 1966) (Whelan and Haring, 1966).

Objections to the model range from criticizing the emphasis placed by this model upon extrinsic reinforcers to its mechanistic, molecular view of behavior to its complicated methods of data taking and analysis. The validity of these criticisms is open to question. Applied to deviant children, especially those characterized by mental retardation and emotional disturbance, operant principles have achieved impressive results. To date, however, most bona fide examples of the operant model are found in research and demonstration centers usually identified with institutions of higher learning.

Miscellaneous Programs. By comparison, preschool programs for categories of high-risk children as yet unmentioned are distressingly few. Variously composed programs for preschool and early school-age retardates (Bradley, 1966) (Malpass, et al, 1964) (Kirk, 1958) (Rouse, 1965) have produced results relevant to reading achievement. General social adjustment outcomes for cerebral palsied children are reported by Zimmerman and Jones (1965); although contrary to expectation, no intellectual gains were observed. Similarly, no apparent improvement in lipreading and reading skills was associated with a preschool program for deaf children conducted by Craig (1964). The weight of the evidence in toto indicates that, where preschool programs for disabled children exist, precision teaching and programming are even more important than is the case for their non-disabled peers. Further, it would seem that society needs to give greater attention to the matter of preschool training for high-risk children other than just those designated socially disadvantaged.

Other Remedial Approaches. Another category of programs for high-risk children is apparently based upon a recapitulation concept of development (Lavatelli, 1968). Learning difficulties are thought to emanate from a faulty sequence of behavioral or neurological development. Remedial techniques are then designed with a view toward creating the "missing link" in the child's development or strengthening a weak one. The most speculative application of this thinking is represented by the work of Delacato (1966). Delacato"s position assumes a relationship between neurological organization and reading ability. His theory and data have been severely criticized (Strang, 1967). Independent validity studies of some of Delacato's contentions have created skepticism (Robbins, 1966) and the entire position is disfavored among many professional societies.

A less presumptious position regarding genotypic factors is that of Roach and Kephart (1966). These researchers reason that a normal sequence of perceptual-motor development is requisite for normal patterns of academic achievement. An organizing feature of this theory is the child's orientation in space. Roach and Kephart provide data which correlate perceptual-motor deficits with academic disabilities. Remedial techniques oriented toward perceptual-motor subskill development have been developed. Validating data from independent research are not available at this time.

Identification of High-Risk Populations

The identification of behavioral deviations (cognitive, affective, and psychomotor) is attempted primarily through teacher referrals, psychometric testing, clinical evaluations, and, in the case of dis-

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advantaged children, socio-cultural considerations. Generally, the literature reflects increasing dissatisfaction with global measures, such as intelligence tests. Stott and Ball (1965) have surveyed and analyzed the mental tests applicable to children which are most frequently used by child workers. This report concludes that more adequate means are needed for appraising the mentality of young children. Many scales in current use lack consistency across age levels and, in some cases, sound theoretical bases.

With respect to school-entry assessment, intelligence tests and reading readiness tests predominate. Unfortunately, even the results of these assessment strategies may find limited use in the schools (Goslin, et al, 1965) (Goslin, 1967). Adequate numbers of trained psychometrists and psychodiagnosticians to handle school-entry assessment are sorely needed. Kindergarten and primary grade teachers are rarely skilled in the application of productive data taking.

In recent years the popularity of a global school readiness concept has waned, although some success has been reported with its use (Ames and Ilg, 1964). Perhaps a more promising trend is toward the measurement of preschool educational achievement (Caldwell, 1967) and of abilities more specifically predictive of reading achievement. In this connection the study of perceptual behavior and its relation to reading has been notable. Shorr and Svagr (1966), for example, have developed a battery of tests, the results of which are predictive of reading accuracy and comprehension for primary grade children. Visual-perceptual behaviors such as the "spiral aftereffect" are thought to be essential diagnostic targets by Snyder and Freud (1967). These researchers maintain that perceptual deficits may occur in many children of normal, measured intelligence and, therefore, warrant careful assessment. Significant relationships between audio-visual integrative skills and reading ability have been found by Ford (1967) and Beery (1967), while Jones, et al (1966) have found a measure of ocular pursuit and fixation to be ineffective for purposes of determining reading readiness.

Interest in the phenomenon of mixed dominance as a supposed indication of neurological impairment has continued in recent years. There are some data to support a relationship between mixed dominance and reading difficulties (Palmer, 1964), although the issue is far from being settled. Stephens, et al (1967), for example, found little support for this contention in readiness test performance among first-grade children.

The Bender-Gestalt Visual-Motor Test was found incapable of discriminating among mildly retarded high and low achievers in reading (Cellura and Butterfield, 1966). In contrast, Weiner and Feldman (1963) report moderate success for an experimental reading prognosis test. The assumption of a relationship between reading and visual abilities is also basic to the Marianne Frostig approach (Maslow, et al, 1964). Independent studies show the Frostig materials to be of some value in predicting general school achievement and specific reading abilities, although more conventional instruments were superior to them (Olson, 1966). A Frostig training program was executed by Rosen (1966) to assess whether perceptual training would produce any change in first-grade reading achievement. While improved perceptual capabilities were noted, no concomitant effects on dependent reading measures were observed. Clearly indicated by the research is further test development and exploration to find the most valid combination of assessments. Variables such as the self-concept (Wattenberg and Clifford, 1964) and impulsivity in visual-matching tasks (Kagan, 1965) are apparently fruitful areas for study.

That efforts to identify early those children whose mental health is suspect are imperative is indicated by Westman, et al (1967). According to these data, adjustment problems of nursery school children tend to persist and are predictive of later mental health service needs. Relevant to such identification are teachers' evaluations of peer relations, behavioral eccentricities, and family relations. Thus the nursery school may serve a critical function for mental health screening and intervention quite apart from other values of such experience. This conclusion is also supported by Cary and Reveal (1967), whose work includes maternal guidance techniques. Lambert (1967) has summarized more completely research trends and attempts at the early identification of children whose behavior is prognostic of school malfunctioning due to mental health problems.

Other data pertinent to early identification include Beach, et al (1968) and Schacter, et al (1968) on the detection of emotional disorders; Haring and Ridgway (1967) for learning disabilities, and Larson and Olson (1963) for the area of cultural deprivation. The latter topic has stimulated test development at the Institute of Developmental Studies (1965). Haring and Schiefelbusch (1967) provide alternatives to the psychometric strategy. Mainly, these techniques are based upon a functional analysis of behavior and are not as yet utilized widely in the public schools. An innovative, task-oriented approach to assessment is represented by learning-hierarchy analysis (Gagne, 1968).

Modification of the School Entry Process

There is a paucity of convincing research data concerning modifications of the school entry process for public school children. Typically, entry is determined on the basis of chronological age. The strict application of this criterion is questionable, particularly in regard to bright children. McCandless (1957) provides an argument, based on psychological theory and research, favorable to early school entrance and other accelerative-enrichment policies for the gifted. For children whose early performance in kindergarten is suspect and for whom global assessments indicate developmental deficits, one of two strategies most frequently prevails. One involves special class placement (e.g., an "adjustment" class). Usually this is possible only in large or otherwise well-financed school districts. A second strategy may involve rough grouping practices with a delay in formal reading instruction until a teacher determines that the child has developed sufficient "readiness." Erickson (1958) describes common organizational approaches. These have apparently not changed much during the past decade.

Practices such as acceleration for gifted children, the nongraded school, and retention-in-grade are employed variously. These, however, represent ways of dealing with children subsequent to school entry rather than with school entry per se. Incidentally, the contention that retention-in-grade is conducive to later school achievement has not been supported by the data of Dobbs and Neville (1967).

A rare experimental study of school-entry problems is represented by the Early School Admissions Project (1964). Data supportive of prekindergarten efforts to attenuate environmentally imposed learning obstacles are reported. Other studies pertinent to school entry policies may have been overlooked by the writer. One point seems clear, however, and that concerns the need for educators to concentrate on the development of systematic and comprehensive procedures for assessing the entering behavior of kindergarten and first-grade children. Without such procedures, individualized instruction is a myth.

Concluding Comment

A variety of curriculum models for preschool education can be observed. All approaches purport, at least implicitly, to facilitate subsequent school success in one way or another. Conventional programs are rarely designed expressly to develop among children pre-reading skills or to combat the development of learning disabilities. Substantial variation in the extent to which preschool programs involve precise instruction can also be observed. Where noteworthy successes are reported, precision teaching is usually involved. Although the development of creativity, self-responsibility for learning, and personal flexibility are by consensus considered to be important objectives of preschool programs, little systematic attention has been paid to these phenomena.

Broad issues underlying preschool education programs include the definition of specific functions, the establishment of criteria by which to test program validity, providing means for the selection of children who will participate and teacher personnel. Also critical is the general issue of what forms of stimulation are appropriate at what periods of development. Problems of faddism and the determination of long-term intervention effects are notable. Also unresolved is the problem of transition from preschool to regular school programs so that continuity rather than discontinuity prevails. Strategies of early detection and prevention of cognitive and affective difficulties are strongly recommended by the research. Unfortunately, broad-scale applications of this knowledge are not as yet evident in many communities. Caution in application is, however, always imperative; thus the judicious application of scientific research methods has never been more necessary in the field of early childhood education.

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THE ROLE OF INDIVIDUAL DIAGNOSIS IN REMEDIAL PLANNING FOR READING DISORDERS

Barbara Bateman

Individualized diagnosis leading to prescriptive remediation is a widely accepted and acclaimed approach to reading disorders. This approach has great face validity and is consistent with common assumptions about the purpose of diagnosis and individualization of instruction.

One element in the diagnostic-remedial philosophy is the view that reading disorders have many possible causes or clusters of causes. Consistent with the disease model, alleviation of symptoms requires a prior analysis of underlying causes. Unfortunately, in some cases the cause, as identified, is not curable, e.g., an alcoholic father or a damaged brain. In other causes, no remedial strategies can be derived from the cause as described, e.g., how does one remediate a reading disorder due to minimal cerebral dysfunction as distinguished from a disorder related to primary emotional disturbance?

Recently, there has been appreciable emphasis on providing the remedial direction often lacking in the primarily etiological focus. This added focus is on correlated cognitive, linguistic, or perceptual-motor problems which accompany the reading disability and presumably are related to it. Within this framework, the correlated deficiencies are remediated and/or used as the basis for planning reading instruction.

Clements (1966) has described the comprehensive diagnosis: "A child has not had the benefit of a complete diagnostic evaluation unless he has had both a medical and a behavioral assessment....The objective of the medical diagnosis is to demonstrate the existence of any causative factors of disease or injury capable of amelioration or prevention. The educational diagnosis involves the assessment of performance and capabilities. Its objective is to make possible the establishment of appropriate remedial programs...". The recommended diagnoses include: history -- medical, developmental, and family-social; examination -- general physical, neurologic, ophthalmologic, and otologic; laboratory tests -- serologic, urinalysis, hematologic, and others when indicated; academic history; psychological evaluation -- intellectual, visual-motor-perceptual, behavioral, and others as indicated; language evaluation -- audiometric, articulation, voice quality and rate, expressive and receptive; and educational evaluation.

In practice, many diagnoses are not that comprehensive, but to be used as the basis for remedial planning they must contain, as a minimum, educationally relevant data (Bateman and Schiefelbusch, 1970). Remedial foci and methods are selected on the basis of patterns of strengths and weaknesses observed on the educational and psychological tests. Educators and psychologists frequently weigh correlates of the reading disability more heavily than etiological factors or disability labels in choosing a remedial strategy. However, the effort is made to consider all relevant data.

The literature suggests comparatively few major unresolved problems in the matter of which tests should be employed or in the ability of experts to reach descriptive concensus in test interpretation or outlining patterns of strengths and weaknesses. This is not to say that all prefer the same tests or employ identical terminology. Rather it suggests that, given a battery of generally accepted tests, a panel of authorities could probably reach basic agreement rather quickly about the areas in which the child's performance was adequate and inadequate. However, difficulties encountered in the next step--selecting remedial strategies on the basis of the diagnosis--will be discussed later.

In some studies children have been grouped for instruction* on the basis of their patterns of performance on such tests as the Illinois Test of Psycholinguistic Abilities and the Frostig Developmental Test of Visual Perception. The evidence suggests that direct instruction in the areas and skills represented by these tests does improve scores on the tests. However, there is little to suggest that improved performance on these tests necessarily is accompanied by improvement in academic areas or even on other tests.

Does Diagnosis Make a Difference?

The question of whether diagnosis makes a difference must be rephrased in terms of which diagnostic data make a difference for what purpose. However, even with this rephrasing, we find definitely conflicting opinions and little conclusive research. Some hold that an extensive battery of tests and several specialists are required before definitive recommendations can be made. Some ask only for a knowledge of what the child has not yet been taught about the task of reading. Others require only time to record baseline data on reading performance, to manipulate reinforcers, and to count responses.

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*Presently there is an upsurge of interest in grouping children according to relevant behavioral dimensions (e.g., Quay, 1968). When testing and observational techniques are employed which yield data on such dimensions, it is only logical that children should be grouped according to what they need to be taught, rather than by any other criterion. Nothing in this paper should be construed as a criticism of that very promising approach. In a similar vein, Lovitt (1967) has urged behavioral assessment of a very different kind from the diagnosis discussed by Clements. Behavioral assessment is discussed and recommended in the final section of this paper.

Some of the most heralded programs for remediating disabled readers are those such as Fernald's and Gillingham's in which a well-defined method is applied to all children with few, if any, modifications. It is difficult to see that diagnosis makes a significant difference when remediation has been predetermined. Some might hold that diagnosis is necessary to establish the appropriateness of any remediation. However, new evidence about the nature of readiness and the dangers of low teacher expectations suggests that all but the most grossly mentally retarded will benefit from good reading instruction.

There may be more than one purpose for diagnosis, however, and data pertinent for one purpose may not be so for another. The purpose might be to obtain basic research data for preventive studies or to establish administrative eligibility for special services, etc. In the educational realm, with which we are most concerned, the usual purpose of diagnosis is to learn what to teach the child (e.g., short vowel sounds) and how to teach him. A detailed examination of the child's reading performance yields data on what he needs to be taught. It is difficult to question this aspect of diagnosis, which is clearly necessary and helpful. Many hold that an analysis of tests of correlated functions such as visual perception, auditory memory, etc., yields clues concerning how to teach. Here a very real question arises, and it is with this aspect of diagnosis that we are concerned in this discussion.

Support for Individual Diagnosis

The entire concept of matching remediation to the child's pattern of strengths and weaknesses has great face validity and commonsense appeal and is supported by decades of clinical acceptance. Among the specific benefits of comprehensive, individual diagnosis, these stand out:

1. Parents may be relieved to hear a name and cause for their child's inordinate difficulties in learning to read. Diagnosis which includes a label, such as dyslexia, may temporarily alleviate problems of having blamed each other and/or the child for his failure. If the parent-child relationship can be improved by this new information, remediation may be facilitated.

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2. Data obtained by this thorough diagnosis are potentially very valuable for basic and preventive research, as exemplified in the NIH Collaborative Research Project.

3. Educator's efforts to obtain definitive etiological diagnoses for children with reading problems often result in increased interdisciplinary awareness and communication.

4. This kind of diagnosis can detect and correct certain problems. In these cases it may appear highly successful, although it is still often difficult to demonstrate that the correction (e.g., a vision correction) was a necessary and sufficient prerequisite for successful teaching.

5. When extensive and thorough test batteries have been administered and interpreted and a recommendation derived, educators understandably feel a genuine effort has been made on the child's behalf and an educational responsibility discharged.

Issues in Individual Diagnosis

Four issues to be considered in the use of individual diagnosis for remedial planning include validity and efficacy, cost and time factors, effect on achievement expectations, and the assumptions underlying derived remediation.

1. Validity and efficacy. The fundamental question of whether this approach works is a very slippery one. A child is diagnosed and then successfully remediated. Was the diagnosis a necessary and sufficient prerequisite to the remediation? Might other remediation, not derived from the diagnosis, have been equally successful? A child is diagnosed, but the remediation is not successful. Was the diagnosis inadequate, or was an error made in deriving the remediation? In any case, it is difficult to establish a valid relationship between diagnosis and remediation.

Evidence on the reliability of educational-psychological diagnosis is almost nonexistent, but a reasonable supposition is that it is adequately high among most distinguished clinicians and quite low among some beginning practitioners. If a given diagnosis were reliable and valid (i.e., confirmed by outside data) would it necessarily yield efficacious or reliable remedial direction? Three years ago this problem was highlighted in the first review of learning disorders to appear in the Review of Educational Research (Bateman, 1966):

> In view of the fact that diagnosis is now seen by many as those processes which determine the type of remedial procedures to be used, it is interesting to note the discrepancies concerning the

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> philosophy underlying the choice of remedial activities.
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> De Hirsch, Jansky, and Langford (1966) held that patterns of modality strengths and weaknesses should determine teaching methods: children strong in both will presumably do best with a combination method, those weak in both need a multiple (including kinesthetic) method; and those with visual-perceptual deficits, but who are good auditors, need phonics. Presumably, the authors would also advocate visual methods for good visualizers.
>
> Cohn (1964)...also advocated teaching to the subject's intact or normal modalities--that is, to his cognitive strengths.
>
> In apparently direct contrast to this, some educators (e.g., Frostig, 1965; and Kirk and McCarthy, 1961) have advocated remedial emphasis in the areas of greatest perceptual, cognitive, or linguistic deficit. Unfortunately, there is little direct evidence on...whether teaching techniques should be geared to strengths or weaknesses.
>
> Harris (1965), in a direct study of the problem of differential first-grade reading instruction geared to visual or auditory preference, was unable to obtain any relationship between specific method and presumed aptitude (pattern of cognitive abilities) for that method.
>
> Further investigation of the area of matching teaching technique to individual patterns of cognitive strengths and weaknesses is underway by this reviewer, and preliminary data analyses support Harris' finding that there is no interaction between subject's aptitude and the method of remediation. [Final data analysis revealed no interation (Bateman, 1968)].
>
> There is no evidence, to this reviewer's knowledge, to support the concept of significant interaction between subject's cognitive patterns and method of remediation.

If consensual diagnosis results in conflicting remediation, can we justify the diagnostic process?

One other problem related to the value of individual diagnosis is that too often, in practice, the data and terminology of many diagnoses lack educational relevance. The proportion of educationally useful data emerging from a diagnosis may be very small. Non-educational terminology can pose genuine problems in meaningfully identifying, grouping, and providing instructional services to children.

2. Cost and time factors. The expense of comprehensive physical, neurological, psychological, and educational evaluations should be examined by cost-analysis techniques. Until this is done and the economic value of diagnostically derived remediation over armchair remediation is demonstrated, some question remains about justifiability.

A related problem is that many remedial teachers have such heavy caseloads that the time spent with each child is severely limited. Under these conditions even the most carefully derived and expensive recommendations may not be adequately implemented or evaluated. In addition, there is a severe shortage of persons qualified to conduct diagnosis and remediation.

3. Achievement expectations. Many diagnostic summaries of conclusions (e.g., "dyslexia due to hereditary factors and possible neurological dysfunction") may have the unfortunate effect of lowering the teacher's educational expectations for that youngster. It is easy and natural for a teacher to respond, "No wonder I couldn't teach him!" and diminish her efforts.

Schools sometimes use a diagnostic-remedial test battery to predict which children may encounter difficulty in the developmental reading program. The children so identified may be given an extended readiness or otherwise modified program which exposes them to less intensive instruction than they would have ordinarily received. The program itself may slow down the rate at which the children learn to read and thereby fulfill the prophecy of poor reading achievement (e.g., see Jordan, 1961). To the extent that the schools are certain they have accurately identified the children who would fail in their regular reading program, they are clearly obliged to alter something. Might it be the failure-producing, regular reading method that should be changed?

The comfortable or easy assumption that something is wrong with the child (rather than with the instruction) might inadvertently serve to delay or prevent critical examination of the basic developmental reading program. A hint of this was seen in one of our states this past year when statewide testing showed below average reading achievement. Many educators there succumbed to the easy suggestion that the children (language problems, poor motivation, etc.) and/or the reading tests were at fault. Only a small group initially viewed the regular developmental reading program as a primary suspect.

4. Assumptions underlying remediation derived from individual diagnosis. The existence of real processes or factors such as visual memory, auditory decoding, motor coordination, etc. needs further

validation. Remediation based on such factors seems predicated on such hopes that bead stringing will enhance the ability to recall a visual sequence of letters. This possibly excessive reliance on transfer of training may produce disappointing results. This criticism or problem clearly does not apply to remediation which is confined to the reading task itself. The proportion of remediation of "correlated deficiencies" to straightforward remedial reading is difficult to estimate. It is probably not as popular in practice as in the literature, but its use is very likely increasing.

The "necessary developmental sequence" premise underlies some prescriptive remediation. More evidence is needed to support the contention that children who show deficiencies in skill "C" need necessarily be given prior practice in skills "A" and "B". The development of most children does, in fact, proceed in a fairly orderly and sequential manner. Whether extrapolation from this to the view that "therefore all children must progress through the same sequence" is justified remains to be seen. Some hold that since children who have never walked or never seen can learn to read, it is inappropriate to routinely recommend "sensory-motor-perceptual" exercises prior to remedial reading, even though the poor reader might be deficient in these areas.

Needed Research

Some of the unresolved but researchable questions which emerge from these issues are these:

1. To what extent are reading disabilities preventable by more adequate initial instruction? Today's assumption is that the child requires diagnosis; tomorrow's assumption may be that the reading program and teaching strategies should be diagnosed.

2. How effective is individually planned remediation versus other kinds of instruction? For example, the apparent success of high-school tutors (who are themselves poor readers) with young disabled readers must give us pause.

3. How much of the data obtained in given diagnostic procedures is actually used in (a) remedial planning, (b) basic research, (c) parent counseling, and (d) other?

4. How economical is the diagnostic-remedial approach compared to other strategies, including no treatment? Cost analyses might reveal startling differences as measured in cost per unit of reading gain.

5. If the diagnostic-remedial approach is found valid, what then is the relationship between diagnosis and remediation? Is effective remediation geared to the child's strengths, weaknesses, neither, or both? The present failure of research to demonstrate interaction between subject and method must be reversed. This research need was given top priority three years ago (Bateman, 1966) and still seems to this writer to be critical:

> "A basic assumption which underlies most thinking in remedial planning is that there is a discoverable relationship between an individual child's symptoms or disruptions in learning and the method of teaching by which he learns most readily. While there has been disagreement concerning whether remedial techniques should be chosen to avoid or to utilize the deficiencies noted in learning channels, almost all have tacitly agreed that diagnosis and remediation ought to be related, either directly (teach to the strengths) or inversely (teach to the weaknesses). Unfortunately, there is as yet no direct evidence to support the efficacy of such a "matching procedure." Research is needed in which recommended remedial techniques would be used with one group, techniques not recommended used with a second group, and randomly assigned techniques with a third group...Also, when educational gains are effected by a given remedial procedure, to what precise factors are those gains related? Are they related to the method itself, e.g., to the simultaneous association of visual and auditory cues? Or are they related to other factors such as individual attention, decreased parental anxiety, or a different learning set?"

An Alternate Strategy

In the event that some of these issues and questions which have been raised are found to be substantive, the need for an alternative strategy to deal with the large numbers of reading failures in this country seems indicated. The incidence of reading failure is increasing if we can believe the current literature. Research on the long-term effects of current remedial efforts is only mildly encouraging, to be generous. Our schools are falling further and further behind in their efforts to patch up reading failures one at a time. Even massive efforts of one of our largest states to subsidize the training of special remedial reading teachers has not seemed to make a substantial dent in the problem. Diagnosticians are increasingly frustrated by heavy caseloads, long waiting lists, and insufficient time to do the thorough diagnosis consistent with their philosophy. Perhaps now is the time to consider shifting our thinking about reading disability away from inadequacies in the child and toward inadequacies in

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our teaching strategies. Recent research by Chall (1967), Gurren and Hughes (1965), Bleismer and Yarborough (1965), Haring and Hauck (1970), Engelmann (1967), Bateman (1968) and many others cumulatively demonstrate that method does make a difference in how well children learn to read. Until all children initially receive good reading instruction, we are being unprofessional in blaming them for their failure. We can only surmise what would happen to the incidence of reading failure if children were well taught the first time.

When we are dissatisfied with the progress a child is making even in "better" regular instruction (and there will be such cases), we offer a model of "behavioral assessment" which is different from diagnosis as proposed by Clements (1966) and discussed in this paper.

Englemann (1967 a,b) points out that most psychological explanations and/or descriptions of behavior of the sort which comprise the usual diagnosis are inadequate. Specifically, they tend to be broad, redundant, too inclusive, and basically irrelevant to the commitments of the teaching role. The guidelines Engelmann recommends are consistent with the behavioral model to be presented below:

1. Express deficiencies so they are in the domain of the teacher and imply specific environmental manipulation. Do not say he "has a low I.Q." The teacher can do nothing about that. Say, "he does not know the concepts of same and different." That implies she should teach him. Do not say his auditory memory process is weak. She has no pills (yet) for that. Say, "he isn't able to say a word which is presented to him very slowly." Do not say he is "emotionally disturbed." Say "he hits other children."

2. Develop criterion-referenced tests that imply specific directions for the teacher. Do not use traditional normative tests which fail to translate into an educational program.

3. Teaching attitudes must be consistent with the teaching situation. Since the teacher controls environmental variables, take responsibility for these...Do not blame the child if he fails to learn. Blame yourself and change your approach.

Lovitt (1967) and Bateman and Schiefelbusch (1970) have presented strategies for behavioral assessment of children's learning problems which appear promising. Rather than utilizing standardized tests, the behavioral assessment procedure includes these four aspects (Lovitt, 1967):

1. Baseline Assessment. Behavior is continuously assessed until a specified level of stability is obtained (reliability of observation).

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Validity of such measures is enhanced because the behavior is observed directly rather than inferred indirectly from a one-or-two sample test measure.

2. Assessment of Behavioral Components. This aspect of behavioral analyses examines and records in detail the behavioral components--stimulus or antecedent events, movements or responses, contingency system or arrangement of events, and the consequences provided contingent upon a specified behavior (Lindsley, 1964).

3. Assessment Based on Referral. The referring agent (usually parent or teacher) is involved in the assessment procedure for at least two reasons. It is important that the assessor and the referral agent be in agreement about the desired behavioral changes. The assessor must also decide whether to deal directly with the adult (usually teacher) who is to do the remediation or with the child. As Lovitt aptly states, "In some cases it is expedient for the diagnostician to deal directly with the programming disability of the adult..."

4. Generalization of Assessment. Reporting of assessment information must be done so that it is immediately transmittable into programming procedures. One of the major reasons for growing disenchantment with traditional diagnosis is that the teacher too often cannot translate test information and clinical jargon into teaching procedures. Lovitt suggests reporting these data: instructions given during the evaluation, exact material presented to the student, events that followed the child's responses, and the child's responses to the various programs.

Lovitt points out that within the behavioral model, "responsibility is implied in that now the remedial obligation rests with the programmer." And this is exactly the philosophy we urge. Let us stop looking for deficiencies and inadequacies in the child and look instead to the program.

The major problems in accepting the changed responsibility for the success of the learning endeavor from the child to the program and in accepting a behavioral assessment model lie in the status quo and in the lack of personnel trained to operate in this framework. Another difficulty is that such a shift of resources and energy toward preventing failure would require some degree of curtailing present remedial efforts with older children. We have always been understandably reluctant to cross off any group of children in need of help.

Summary and Limitations

Three major points have been developed:

1. Present data do not adequately support the reliability, validity, economy, and underlying assumptions of the individual diagnostic and remedial planning approach to reading disorders, in this reviewer's opinion.

2. Much greater effort to prevent reading disorders through substantial revision of initial reading instruction is essential and must be demanded of our public schools. Educational emphasis must be shifted from inadequacies in the child to the inadequacies in our teaching.

3. A behavioral-assessment model is suggested as a replacement for the individual diagnosis concept as a more profitable approach to those children we fail to teach adequately, even with better programs than now employed. This, obviously, places an immediate responsibility on those charged with training professional personnel.

The following limitations, among others, should be noted in this paper:

1. The degree of reading retardation under consideration has not been specified. Many of the issues which have been raised have greatest applicability to the mildest 90 percent of reading problems and little to the most severe 10 percent.

2. The entire issue of whether dyslexia exists as a diagnosable entity has been sidestepped. The rationale here is that teachers must teach, regardless. The data they need are (a) what to teach and (b) how to arrange the environment most effectively.

3. The reading task is assumed, in this discussion, to be made up of basic, irreducible skills and knowledge which must be possessed by all who would read, regardless of their cognitive or sensory-motor preferences or deficiencies (See Engelmann, 1967b).

4. Data and studies have not been cited as extensively as would be desirable. Space limitations forced a choice between data and exploration of the issues, and the latter was emphasized.

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THE NATURE OF THE READING PROCESS, THE RATIONALE OF NON-EDUCATIONAL REMEDIAL METHODS

Richard L. Masland and Bryant J. Cratty

I. Introduction

Reading is a complex process involving the interaction and integration of ocular, perceptual, associative, and motor abilities.

In the process of reading, the individual must first regulate the larger muscles in his body to stabilize his visual apparatus, then he must scan the printed page through proper eye movement control. As he looks at the page, ocular processes must permit the forms on the page to be accurately transmitted to his retina and to his brain. He must differentiate the various simple and complex letter-word shapes.

He must then relate these letter-word symbols to the verbal symbols and to the concepts for which they stand. Within the classroom, these meanings must then be translated into written or verbal symbols so that the teacher will receive confirmation that the meanings the child attaches to a word-shape are the same meanings she gives to them. This process also presupposes an already existing verbal language structure bearing reasonable similarity to that of the written material.

If this rather complex explanation of the reading process is accepted, it is apparent that the causes for failure to read well are numerous. The child may not read well because his ocular system does not function adequately. He may not read well because he does not perceive word-shapes correctly. His reading progress may be impaired because he cannot associate the word-shapes with the corresponding verbal symbols. If his verbal language structure is imperfectly established, the association of the word-shapes and the sounds they represent with meaning will be faulty. Faulty visual or auditory memory will prevent retention of essential learned material.

Possibly it is not adequately recognized that for many children reading develops through several stages. In the early phases of reading (e.g., grades 1-3) emphasis is on the decoding procedure - the recognition and learning of the visual cues and of their relationship to a corresponding auditory verbal symbol. The later stages of reading, extending even through the high school years, involve facility in the extraction of meaning. For this purpose, the associated auditory element is unnecessary or even redundant, and precise analysis of word structure and its phonic equivalent is no longer necessary to the same degree. The intellectual skills required for these two phases of reading learning appear to differ - the decoding process requiring certain specific cognitive abilities; the ability to extract meaning, which involves the use of minimal cues, relating more closely to overall intelligence. There are differences of professional opinion regarding the appropriate emphasis on decoding or meaning extraction at various stages of learning to read (Chall, 1967). Some of this controversy may stem from the fact that children differ in their methods of learning and thus require a different emphasis.

Analysis of treatment programs reveals that they are directed toward remediation of various levels of the reading process as follows:

1. Programs to modify behavior, change attitude, encourage visual attention, or improve study habits.
2. Programs to develop better neuromuscular coordination.
3. Eye exercises or surgery to correct disorders of accommodation convergence, eye movement or coordination.
4. Training in the recognition and analysis of shapes and objects - right-left orientation and perceptuo-motor relationships.
5. Training with emphasis in the recognition of the written language symbol and its association with its auditory counterpart (phonics). (Such training may include kinesthetic and somesthetic reinforcement through handling or tracing letters.)
6. Training including language analysis.
7. Training with emphasis on the extraction of meaning.

Many programs comprise several or all of these elements. However, to the extent possible, they will be analyzed in terms of the major emphasis of the effort, and the evidence for or against its efficacy.

II. Physical Education

At the present time, the view that well developed spatial orientation and body image is a prerequisite to reading learning has led to a revival of interest in physical training. Although present programs provide greater emphasis on specific training in body control and coordination, studies of the effects of general physical education on school performance are relevant to this problem.

Oliver (1958) evaluated the effects of physical exercises on the intellectual development of educationally subnormal boys. A group of boys in a boarding school environment received a ten-week program of progressive physical conditioning. This group showed a very significant gain in IQ, when compared with a control group of children in the same school who did not receive this special program.

However, a similar study by Solomon and Pangle (1966) failed to demonstrate IQ changes as a result of physical education experiences, although there were significant and persistent gains in physical fitness. In this study a group of 41 boys enrolled in four public school special-education classes was divided into four groups - three with various types of activities and one as the control group. The training program of active physical fitness training lasted for two months.

Corder (1966) compared 3 groups of noninstitutionalized educable, mentally retarded boys aged 12-16. One group "training" received a 20-day program of exercises and track events. One group attended these events as "officials." A third group served as "controls."

Analysis of the data revealed that the "training" group made significantly greater gains in verbal and full scale IQ than the "controls." However, they did not make significantly greater gains than the "officials." The "officials" showed gains insufficient to be significantly greater than the"controls" -- thus occupying a position between the "controls" and the "training" groups. The improvement of the "officials" was attributable to the "Hawthorne" effect -- improved morale, interest, etc., as a result of participating in a novel situation. However, the "training" group showed gains above this, which the author suggests may be that "for 20 days the training group was trained to listen carefully to counts, commands, and instructions. Each individual learned to respond quickly to starting signals and various drills. Furthermore, the training group was given tasks requiring concentration." It is interesting that the significant gains in the "training" group were limited to the verbal scale, there being no significant difference in the performance scale of the three groups. This study demonstrates the problem of distinguishing between the direct effects of physical activities and the associated benefits of personal attention, intellectual stimulation, and attitude changes which may be involved. To date, there are few if any studies of the effects of physical education on intellectual development in which these elements are adequately controlled and which demonstrate a beneficial effect of exercises on intelligence or school achievement.

These studies reveal the difficulties in such controlled studies in distinguishing between the benefits of the specific measures used as opposed to those accruing from subtle psychological and motivational changes, or from other unrecognized elements in the environment. They lend little support to the thesis that physical education per se

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contributes to the learning process. In addition, the fact that severely physically crippled children may learn to read readily casts doubt on the basic hypothesis of this procedure.

III. Lateralization of Brain Function

It is well established that, in the human, language functions become strongly lateralized to one hemisphere of the brain. In about 91.6% of individuals this center is in the left hemisphere. In left-handed persons, the language centers are still on the left side of the brain in possibly 30% of instances (Rossi and Rosadini, 1967), although in such persons a greater degree of bilaterality of brain function may exist. While language functions clearly center in the "dominant" hemisphere, certain other functions, notably spatial orientation and the visual recognition of complex forms, appear to be more effectively mediated by the right or nondominant hemisphere (Gazzaniga, Bogen and Sperry, 1965; Weinstein, 1962).

Certain remedial procedures have been developed for the purpose of facilitating the establishment of the language function in the dominant hemisphere. These procedures depend upon the following hypotheses: 1) That failure to establish the language function in the left hemisphere is a significant factor in reading disability. 2) That there is a correlation between handedness or eyedness and cerebral dominance for language. 3) That the manipulation of handedness or eyedness can influence the localization of language function. 4) That lateralization of all functions -- language-vision-and handedness in one hemisphere will improve reading ability.

Studies of hand, leg, and paw preference among primates, mammals, and insects demonstrate that all mobile organisms function asymmetrically. For example, grasshoppers have a preferred scratching leg, rats manifest paw preferences that cannot be trained out of them, while chimpanzees evidence hand preference (Hecaen and Ajuriaguerra, 1964). A subhuman ancestor of man, the australiopethicus, with a brain approximately a third the size of modern man, evidenced unilateral hand use, and was probably right-handed. It is not surprising to find, therefore, that modern man also evidences unilateral hand and eye preference.

It is probable that both hand and eye preference are inherited (Ramaley, 1913; Merrell, 1957). Merrell, for example, found that 77% of the offspring of right-eyed parents tend also to prefer their right eye, while only about 46% of all children of parents both of whom are left-eyed tend to be right-eyed. Hecaen also provides data showing that hand preference is inherited. Ramaley suggests that left-hand preference is a Mendelian recessive trait (Ramaley, 1913), and most of the evidence supports this contention.

However, to a lesser degree, functional asymmetries are molded by the culture. Hand preference, in particular, is probably molded to a greater degree by cultural pressures than is eye preference (Orton, 1943). Hildreth, for example, found that it is less likely that children will use their left hands when performing tasks in which they are likely to incur social censure (Hildreth, 1948). There are fewer left-handers in the older populations of people than in the younger group samples, further reflecting the influence of cultural pressures upon those whose preferences are not marked.

There is a closer association between hand and foot preferences than between hand and eye preferences. It is more likely that an individual will be either left-footed and left-handed or right-footed and right-handed than that he will evidence similar eye-hand preference (Merrell, 1957).

It has been postulated that hand and eye preferences are related to speech and reading functions, and that cross-dominance and left-handedness may negatively influence reading, speech and other perceptual and motor functions. Dearborn (1931) suggested, for example, that left-handedness interferes with normal left to right sequencing in reading. Orton (1928) and others (Gilkey and Parr, 1944; Teegarden, 1932) have also speculated that mixed dominance interferes with reading and contributes to letter reversal in children.

A comprehensive examination of the research literature, however, does not fully support the thesis that there is a close relationship between hand-eye preference or mixed dominance and reading ability. Some observers have obtained some supporting data. Castner (1939) has produced data which suggest a relationship between hand preference and reading, reporting that 67% of his poor readers were left-handed. Zangwill (1962) states: "On balance, the evidence suggests that an appreciable proportion of dyslexic children show poorly developed laterality, and that in these there is commonly evidence of slow speech development." On the other hand Orton (1937) stated, in contrast to his statements in earlier publications, that handedness and eye preference are not critical in reading and that training for eye and hand use should have no positive effect on reading or other academic functions.

Stephens et al(1967) made a study of "Reading Readiness and Eye-Hand Preference Patterns in First Grade Children." Among 89 children, comparisons on the basis of sex and eye-hand preference patterns yielded no significant differences in levels of reading readiness. Coleman and Deutsch (1964) found no difference in lateral dominance in 110 poor and good readers under the age of 10 years. Woody and Phillips (1934) also found that hand preferences were not related to

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reading in younger children, while Pace (1937) found that hand preference was not related to poor reading in college age students. Balow and Balow (1964), Witty and Kopel (1936), and Belmont and Birch (1965) similarly failed to find that preferred hand and eye use was predictive of reading success.

In fact the data of Belmont and Birch suggest that it is a form of right-left confusion which characterizes the poor reader rather than true mixed dominance or a disorder of handedness. Benton's further analysis of these observations suggests that the basic disorder is in language comprehension and concept formation, and that disorders of handedness are simply related deficits without a causative influence.

Cross dominance (as opposed to left handedness) has also been investigated in view of the earlier hypothesis of Orton (1928), Dearborn and Leverett (1945), and Wyckoff (1943) and others. However, again the majority of the data fail to support these speculations. For example, Flescher (1962) found that mixed dominance was not a factor in reading. Spitzer et al (1959) using 1,900 children found also that mixed dominance was as prevalent in groups of poor readers as in groups of superior readers. Stephens et al (1967) found no relationship between cross-dominance and reading. Forness (1968) found that cross-dominance was not more frequent among poor readers who evidence signs of neurological impairment than in a group of poor readers who did not evidence neurological impairments. "The findings from this investigation do not support the thesis that cross dominance is a symptom within a general syndrome characterized by evidence of minimal neurological impairment sometimes associated with poor reading." (Forness, 1968)

Young children sometimes reverse letters and numbers, a tendency which usually disappears by the age of 7 (Hildreth, 1932; Wilson and Flemming, 1938; Hagin and Silver, 1966; and Davidson, 1934). This tendency is greatly exaggerated in some instances of reading disability.

As mentioned above, Orton and others (Orton, 1928; Wilson and Flemming, 1938) have suggested that hand and eye preferences, as well as cross-dominance, may be related to reversal problems, and that reversal problems, in turn, are associated with poor reading. For example, Teegarden (1932) presented evidence that reversal problems were correlated ($r=.54$) with scores predictive of reading failure and achievement at the end of the first school year.

However, neither hand preference nor mixed dominance seem closely associated with reversal problems in children. Muehl (1963), Flescher (1962), and Gilkey (1944), for example, all found that left handers made just as many reversals as did right handers. Beck (1960), after finding that reversals were not due to any specific eye dominance pattern, suggested instead that problems of visual perception, spatial orientation, and recognition of form caused children to reverse letters and numbers.

There are some theoretical bases for the hypothesis that as originally postulated by Orton, a disorder of interhemispheric relations in the brain may underlie difficulty in distinguishing objects which are mirror images (Masland, 1968). Visually perceived objects may be most readily interpreted within the right hemisphere of the brain; language is primarily mediated within the left hemisphere . The establishment of a written language code requires that these two functions become associated, and a mirror image confusion might be a result. However, the number of children in whom mirror writing is a prominent symptom is very limited. In the majority of dyslexic children, the findings indicate a far less specific, or possibly more diverse symptomatology.

Even assuming that in some children there exists a harmful mixed dominance, what evidence is there that manipulation of hand or eye use can influence cerebral dominance for these functions,or especially for language? Such studies do not appear to have been carried out. Lacking this, what empirical data have been provided to support the thesis that shifting hand or eye use will improve reading? For this, we seem to be dependent upon individual impressions and random case studies. Well-controlled studies of the contribution to reading achievement of limitation of hand or eye use are not available.

Summary, conclusions. The literature regarding the relationship between handedness, brain dominance and reading disability is voluminous, often contradictory, and most confusing. However, from the broad review the following conclusions are reached:

1. It has not been demonstrated that laterality of hand or eye dominance, or mixed dominance bear a direct relationship to poor reading.
2, There is a very low correlation between handedness or eyedness and brain dominance for language. There is no evidence that changing handedness will influence the lateralization of other functions.
3. There are neither theoretical nor empirical data to support efforts to change handedness or eyedness as a means of improving reading ability.

IV. Improvement of Eye Movement

The process of looking - that is of focusing the image looked at upon the retina of the eye - is a highly complex,coordinated activity. The muscles of accommodation within the eye must provide proper focus. The external eye muscles must turn both eyes toward the object with sufficient precision that the images in the two eyes are superimposed. These relationships change with distance and movement, and are under control of some image recognition centers in the brain. The visual input actually consists of a series of static pictures - objects are not seen while the eyes are moving, but only when fixated. The scanning of the printed page thus consists of a series of eye jumps and momentary pauses. This latter process determines what is looked at, but also depends upon the recognition of the object seen. Disorders of this fixation process have been suspected of causing reading disability. However, it is evident that deviations of eye movement might just as well be a result of faulty word recognition as a cause.

Various aspects of the visual process have been studied in relation to reading disability. Johannes Muller (1826) carried out the first studies of eye movements in 1826. In 1879, the engineer and ophthalmologist, Javel (1879), studied the manner in which the eye moves when reading. Since that time, many studies have been carried out in connection with reading. Researchers since 1899 have utilized 25 different eye-movement cameras for research purposes (Taylor, 1937); while within recent years, the use of the EOG (electro-oculogram) has been employed to an increasing degree (Jones et al., 1966).

This equipment has been able to measure eye fixations while reading, regressions of the eyes during reading, efficiency tracking, and similar measures. However, the relationships between specific eye functions and reading success still remain obscure.

Further confusion is added to the problem as one attempts to separate the influence of training and maturation upon ocular function. Some have stated, for example, that with continued exposure to a printed page, many ocular problems seen in young children disappear by early adolescence. The eyes may become trained to engage in more exact near-point fusion and in similar functions as children practice reading during the elementary school years.

Morgan, (1939) after finding moderate to high correlations (r=.4 to .7) between ocular measures obtained from identical twins while reading, postulated that eye movement characteristics during reading, including fixations, regressions, etc., are to some degree inherited.

However, maturation and practice undoubtedly play an important role in the efficiency with which the eyes move when reading. Taylor, (1957), for example, studying the manner in which the eyes fixate while reading as a function of age, found that, in the first grade, the number of fixations averaged 240 per 100 words, while by the time college was reached, the average number of fixations per 100 words had dropped to 73. The averages he obtained are as follows:

GRADE	FIXATIONS PER 100 WORDS
1	240
2	200
3	170
4	136
5	118
6	105
Junior High	95
High School	83
College	73

These data point out that efficiency in reading may not be correlated to efficiency of eye-tracking movements, but may be more closely related to the efficiency with which the eyes are stopped and fixed. It is during this period of fixation, Taylor concludes, that perception occurs. Reading speed and comprehension are related to the lateral amount of print at each fixation. The inability to fixate clearly has been attributed to several causes including emotional stress (Smith and Semmelroth, 1964-1965), ocular muscle uncoordination, and lack of comprehension of the words on the printed page.

An even more basic question is: what percent of reading efficiency depends upon ocular function versus perceptual efficiency and cognitive processes? It is probable that ocular efficiency is a more important variable influencing reading among groups of younger children than in groups of older children (Park and Burri, 1943). At the same time, the available evidence does not specify within large populations of normal children the exact manner in which such eye defects negatively influence reading success.

It might be noted, however, that individuals suffering from congenital nystagmus, a condition characterized by continuous irregular eye movements, may still show a high degree of reading proficiency.

Even more attention has been directed toward other aspects of eye movement control, specifically the relationship between accommodation and convergence, and the balance of eye muscle action. It is attractive to assume that imbalances of these muscles might be associated with ocular fatigue, and thus impede reading.

When the eye function of groups of poor and good readers have been compared, the characteristics most frequently found among the former groups are difficulties in near-point fusion (Wagner, 1937; Eames, 1938: Park and Burri, 1943), Esophoria (Park and Burri, 1943, Wagner, 1937), Exophoria in distance (Eames, 1932, 1938, 1948, 1949; Park and Burri, 1943; and Hyperopia (Gillet, 1942).

Numerous studies have demonstrated that good readers are likely to be myopic. The incidence of myopia is very high among advanced students in academic environments. It is not now established whether this is because myopia facilitates reading, whether near work such as reading produces myopia, or whether myopic individuals simply prefer sedentary activities since their distant vision is blurred.

It should be noted that a carefully controlled study has failed to demonstrate that eye exercises can improve myopia (Woods, 1946).

The role of ophthalmological factors in learning disabilities has been reviewed by Lawson (1968). He notes that the role of ocular factors in the cause of reading disabilities has been refuted. However, eye defects can aggravate a learning disorder. In his own studies, including tests for hyperopia, astigmatism, strabismus, myopia, crossed-dominance, or anisotropy, the behavioral characteristics of children having eye dysfunctions could be differentiated from those who did not. "Irrespective of the nature of the visual condition, if a dysfunction is present, the child is likely to have a different type of learning disability as compared with the child who has a learning disability, but no complicating ophthalmological disorder." The meaning of these preliminary findings requires further elucidation.

The present state of knowledge is best summarized by a special report of the Ophthalmological Section of the Los Angeles County Medical Association (Irvine et al, 1941) "...If the visual acuity is reduced 50% or more, the child will have difficulty in interpreting symbols because he cannot see well....Except in farsightedness and astigmatism of a marked degree, the child's power of focusing is sufficient to give adequate though not perfect vision, and a small amount of myopia may even be an advantage rather than a disadvantage in reading. The presence of a crossed eye with normal vision in one eye has little or no effect on reading ability.... Compensated muscle imbalance, such as phorias of a marked degree, does not affect interpretation of symbols.... So-called 'faulty' eye movements, as judged by regressions, depend primarily on poor visual understanding of subject matter read and not on incoordinated eye muscles.... Not the eyes, but the brains learns to read."

The problem of dyslexia was reviewed by a panel of ophthalmologists at a symposium sponsored by The Institute for Development of Educational Activities (Helveston, 1969). The seminar prepared the following position statements.

"1. Not enough objective scientific evidence yet exists to prove that perceptual motor training of the visual system can significantly influence reading disability.

"2. In coping with dyslexia, ophthalmologists should be involved in an interdisciplinary approach, which ideally consists of an educator, ophthalmologist, pediatrician, and psychologist with available consultation from a neurologist, psychiatrist, reading specialist, audiologist, and social worker.

"3. Eye care should never be treated in isolation when the patient has been referred with a reading problem.

"4. The belief that eye dominance can be at the root of so profound and broad a human problem as reading and learning disability is both naive, simplistic, and unsupported by scientific data.

"5. Latent strabismus may be associated with a reading disability in certain individuals. This may be treated according to the doctor's own ophthalmological principles, but it is significant to the learning problem only in improving reading "comfort or efficiency"

"6. Eye glasses, including bifocals, prescribed specifically for the treatment of dyslexia have not proven effective.

"7. Just how children with reading disabilities should be taught is a technical problem in educational science, which lies outside the competency of the medical profession.

"8. Educational research is needed in the correction and prevention of reading disabilities."

V. Measures to Improve Body Control, Perception, Body Spatial Orientation, and Visuo-Motor Coordination.

Since a number of programs include training in body control and in visual perception, and especially since it is postulated that these two functions are closely related, these aspects will be considered together.

Introduction. The practices advocated by various advocates of such programs do not differ greatly. They include visual training, balance activities, and gait training. The theoretical bases for these programs, however, are quite dissimilar. Kephart, for example, emphasizes the establishment of four types of basic "motor generalizations" which support perceptual accuracy which, he asserts, in turn, improves intelligence (Kephart, 1960, 1964). Getman, (1962, 1963) similarly emphasizes the importance of motor activity, but usually pairs movement with vision in the training procedures outlined. Getman states that the primary way in which a child learns is through vision, and thus deficiencies in various ocular functions can exert a significant negative influence upon learning. Delacato's theory, outlined in several texts (Delacato,1959, 1963) suggests that the recapitulation of locomotor stages in a child's development will correct reading problems and numerous other perceptual and sensory deficits. The practice techniques he advocates include creeping, crawling, "patterning" in what he terms a tonic-neck reflex position (assumed face down). These motor activities are coupled with efforts to "lateralize" and "neurologically organize" children by withdrawing musical experiences, occluding one eye, and forcing the use of one hand. He believes that these latter techniques will influence the localization of language functions in the dominant hemisphere and thus exert a positive influence upon defective speech, reading, audition, and other communicative processes. The following paragraphs contain a more detailed evaluation of the theories and practices advocated by Drs. Kephart, Getman, and Delacato.

Kephart. Kephart states in several publications that "motor learning is the basis of all learning" (Kephart, 1960, 1964). Preceding from this basic premise, he outlines motor activities which will positively influence academic and cognitive acts. For example, in his 1956 text, he states that affording a clumsy child balance training will improve the functioning of deficient cerebellum which may be "short-circuiting" thoughts descending from the cortex. The bases for this theory is in the establishment of what Kephart terms "motor generalizations." These include:

(a) Posture and Balance. Balance training is to teach the child to orient to the "only constant in the universe" (gravity). It is suggested that a child who cannot balance well cannot be expected to make accurate perceptual judgements of any type due to the unstable base from which spatial judgements are made (i.e., his body).

(b) Locomotion. Locomotor training will aid a child to move through space and to better learn about the dynamics of his relationships to objects and things.

(c) Contact. Manual manipulation of objects will teach the child about size, shapes, and other object characteristics. It is further suggested that, as the child learns about near-space by forming "visual-motor" data as he handles objects, these data are extrapolated to distant space. Thus it is proposed that manipulative activities can positively influence judgements in distance-space, and conversely, manipulative experiences can prevent possible perceptual problems.

(d) Receipt and Propulsion. It is postulated that experience with moving objects, especially such as throwing and catching balls will aid the child to formulate judgements about sizes, distances, and velocities in distant space.

Kephart also states that a child's body-image, particularly his ability to differentiate verbally and motorically between left and right sides is related to his experience in relating his body to his environment. Stemming from this is the suggestion that reversal problems will be aided by body-image training.

Kephart's theory may be examined from theoretical evidence and by the review of empirical data.

From the theoretical point of view, recent studies such as those of Held and Schlank (1965) on motor adaptation to perceptual distortion reveal a very close link between motor activity or participation and the development or modification of perceptuo-motor skills. These studies also demonstrate most strikingly the specificity of motor learning. For example, retraining of one hand under visual guidance will not materially alter the motor performance of the other, untrained, hand. Such studies raise serious questions as to whether training in gross motor movement or the handling of moving objects will have much carry-over to the recognition of complex geometric figures, or especially written letters; or to the fine movements of writing.

Belmont and Birch (1966) have demonstrated that impairment of right-left discrimination is a significant finding in cases of severe reading disability. However, Benton (1968) points out that there is no evidence that the poor reading is a result of inadequate left-right discrimination. On the contrary, he suggests that a more fundamental disorder of concept formation is the underlying cause of both inadequate discrimination and poor reading.

Data collected by Cratty (1968) as well as in a study by Ayres (1964) reveal that measures of directionality in children with perceptual-motor deficits are not related to their ability to correctly identify their left and right body parts. Furthermore, the work of Smith and Smith (1966) reveals little relation of visual-perceptual ability to reading skills, while the studies of Fleishman and others (Fleishman, et al., 1961; Harris and Harris, 1963) through the years have pointed to the specificity of motor performance. Thus, to suggest that the influence of motor learning on perceptual processes has relevance to reading instruction and intellect is an unjustifiable extrapolation of the available facts.

Studies summarized by Bloom and others (Bloom, 1964; Honzik, et al., 1948) have pointed out the difficulty of predicting later intelligence by evaluating the perceptual-motor attributes of young children. Not until a child is about 5 can one predict his IQ in later childhood with any degree of accuracy. Thus Kephart's suggestion that early motor ability is influential and predictive of later intelligence appears to overestimate the importance of movement experience in the formulation of intelligence. Kephart suggests that training of visual tracking will positively influence academic success, but data demonstrating that visual training significantly improves visual tracking and/or visual tracking in turn positively influences academic performance are inadequate.

Empirical data on the effects of Kephart's methods on reading are also available. Generally, the results have been negative. LaPray and Ross, (1966) for example, compared reading improvement by first graders low in reading in two groups, one of which was subjected to visual training and large muscle activities, while the other was exposed to practice in reading. The former group improved on perceptual-motor tasks, while the latter improved more in reading. Roach (1966) and Brown (1968) similarly found no significant differences in oral reading on the part of groups exposed to Kephart's techniques. Haring and Stables (1966), on the other hand, reported that various perceptual and motor attributes were improved in a Kephart-type program, but no reading measure was obtained in this later investigation.

Fisher, in an investigation finished in 1969, also has produced data which suggests that Kephart's assumptions and training procedures are less than helpful. He found, for example, that a short-term, structured program of training in the perceptual-motor activities following Kephart's suggestions had no effect upon perceptual-motor performance, and upon measures of academic achievement of educable mentally retarded children with minor motor problems.

In summary, the available data provide little theoretical or empirical support for the thesis that training by the technique outlined by Kephart will make a significant contribution to the reading skills of normal children or of those with reading problems.

There are facets of the Kephart program which may have value, however. Rutherford (1965), for example, studied the influence of Kephart-type activities upon scores obtained from kindergarten children in the Metropolitan Readiness Test. He found that while the boys had gained significantly, the girls did not. His carefully designed methods of motor training of neurologically impaired youngsters should prove of value when attempting to improve their motor functions. Brown, moreover, has found that the attributes in Kephart's program which are trained for specifically, do improve (Brown, 1968). Furthermore, Kephart's suggestion that motor activities may prove to be good preparation for learning has not been adequately researched, and thus the hypothesis should not be summarily dismissed without further investigation.

Delacato. The Delacato theory is based upon the concept that specific structures or levels of the brain control various levels of motor integration. It is postulated that proper functioning of the nervous system is developed systematically from the most primitive to the most complex, and that the higher, more complex functions cannot develop properly unless the primitive ones have been well established. For remediation even of a cognitive defect, one must therefore recapitulate the phylogenetic and ontogenetic processes, perfecting the most primitive activities such as creeping and crawling before striving for perceptuo-motor skills, the cultivation of the dominant hemisphere (lateralization) and finally, the pursuit of cognitive skills.

Critical to the theory is the establishment of hemispheric dominance to improve speech and other sensory functions by training in unilateral hand use, monocular activities, and a removal of music and other tonal experiences from the child. Tonality, it is hypothesized, is mediated by the non-dominant brain hemisphere and thus listening to music conflicts with the achievement of dominance by the half of the brain which controls speech functions.

This theory and the related practices may also be examined on theoretical or practical grounds. The most generally held current theories of neural organization do not support Delacato's views. Complex locomotor functions have been found to be controlled by organized systems throughout the brain rather than in the hierarchical manner postulated. One hand use, as has been pointed out, is seen in a variety of man's early animal ancestors, and thus would not seem to be evidence of the height of neurological development in modern man. The child development literature also contains extensive evidence that children do not develop in accordance with the theory. For example, several visual processes mature rather early, prior to the emergence of accurate motor attributes. Ocular processes involved in visual tracking have been found to mature by two years, while perfect gait patterns are not usually seen in children until their fourth year.

There are other evidences that motor experience is not essential for intellectual development. Children with congenital defects characterized by lack of both arms and hands may develop without gross deviation of intellect as may children with complete body paralysis due to spinal cord transection. These examples demonstrate strikingly that the intellect may develop normally in the presence of severe deprivation of the motor experiences which the Delacato theory postulates to be essential

The program recommended by Drs. Doman and Delacato has also been criticized because of its failure to recognize its potential psychological and social impact upon the child and his family. It is suggested, for example, that a child be made to crawl, despite protestations to the contrary, by the forceful presence of a physical education teacher. In contrast, Temple Fay, from whom Delacato claims his original concepts, has written that the child is "not merely a motor expressive robot to be tuned up or activated as we choose... motivation that lies behind rehabilitation is found not in the better movement of this part, but in the hoped for and possible purpose that this returning function might serve...the true art of therapy lies not in what is done, but how the patient may receive it"(Fay, 1954).

The American Academy of Pediatrics (1968) stated its concern that "The regimens prescribed are so demanding and inflexible that they may lead to neglect of other family members' needs." Rabinovitch (1965) also stated that the creeping and crawling techniques are regressive and may bring about emotional disturbance. Whitsell (1967) in a comprehensive evaluation of the method, concludes with the suggestion that the Delacato techniques "have not been validated and are not consistent with accepted neurological principles." Furthermore, Whitsell states that "this method may best be regarded as experimental, potentially harmful, and not to be recommended for general use at this time."

A number of empirical studies have been published by the Philadelphia Institute for the Achievement of Human Potential containing data to substantiate the worth of the programs. Several reviewers, however, have specific criticisms of the methodologies of these studies. Glass and Robbins' (1967) term "of dubious value" has been concurred with by Albert Harris and others (Harris, 1968; 1968a).

A study by Kershner (1968) involved a comparison of two groups of severely retarded individuals of ages ranging from 8 to 18 years. One group of 13 received a strict regime as recommended by Doman and Delacato, the 16 "controls" received non-specific games and play. Comparisons were made of improvements in creeping and crawling, in perceptuo-motor skill (Kershner revision of Oseretsky) and IQ (picture identification). The study showed statistically significant advantage for the treated group in creeping and crawling and in IQ but not in perceptuo-motor development. The study is of dubious value because of the fact that the two groups ("treated" and "control") were not matched, and comprised children of widely differing ages and initial intelligence level. (The initial mean IQ of the treated group was 39.77. That of the controls 61.94.) In addition, the disparity in gains of IQ as compared to perceptuo-motor development is inconsistent with the basic Delacato theory.

Other tests of the validity of these methods conducted outside the institutes which developed them have produced findings which are not supportive. Anderson (1965), for instance, tried cross-patterning and creeping on kindergarten children and intermediate grade students, and found that children within these groups with lower IQs and with lower initial reading ability did not improve.

Two carefully controlled studies were carried out by Robbins (1967) who first spent some months at the Institute for the Achievement of Human Potential in order to obtain a clear understanding of their methods.

In a study of normal school children the Doman-Delacato technique failed to produce greater improvement of reading than that observed in a group encouraged to listen to music and to use unrecommended sleeping and movement postures and in a third untreated group. Similar results were obtained in a second study involving a group of retarded readers (Robbins, 1967). In addition, these studies failed to confirm the postulated relationship between creeping and crawling skill and reading, or between lateral dominance and reading. He thus was not able to obtain confirmation either of the theoretical concepts of the theory or of the practical value of the remedial program.

Yarborough (1964) using a stereoscopic method (similar to the Delacato techniques) designed to lateralize children also found no evidence of significant benefit in reading. McCormick, et al (1967) also found no significant changes when employing Delacato procedures with first-grade children. These latter investigators disregard a non-significant analysis of variance, however, and point out a gain in mean scores to bolster a positive hypothesis.

Within recent months, the Delacato method has been the target of serious criticism. Twelve major medical and health organizations* have concurred with Glass and Robbins (1967) that "There is no empirical evidence to substantiate the value of either the theory or practice of neurological organization," and chided its supporters for claiming cures without documentation (Official Statement, 1968). Opinion of medical and research personnel thus seems almost unanimous in their condemnation of the methods and theories of this method of reading remediation.

This being the case, how can one account for the recorded successes of this method of treatment? There are a number of instances of children said to have been diagnosed by members of the medical profession as "hopeless" who, under this treatment regime, are now said to be normal. This evidence merely highlights the unreliability of diagnosis in the small infant, and the hazards of making a hopeless prognosis *especially if this is used by the family and the profession as a justification of depriving the child of an active therapeutic and educational regime*. Studies, too numerous to mention, can be presented to prove the beneficial results of active stimulation and emotional support in the deprived child. Another intangible factor, difficult to evaluate in a treatment regime highly charged with emotion, is the effect of attitude changes in the child or parent. Under the Doman-Delacato program the parents must assume a heavy responsibility and a deep personal involvement in the remediation program. There are instances in which this may be most beneficial. Thus, while rejecting the principles and practices of the Doman-Delacato program, the profession has a responsibility to address itself to its own failures, upon which such dubious programs appear to build their public support.

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* American Academy for Cerebral Palsy, The American Academy of Physical Medicine, The American Congress of Rehabilitation Medicine, The Canadian Association for Children with Learning Disabilities, The Canadian Association for Retarded Children, The Canadian Rehabilitation Council for the Disabled, and The National Association for Retarded Children, American Academy of Neurology, American Academy of Pediatrics, American Association on Mental Deficiency, American Association of Ophthalmology, and Easter Seal Society for Crippled Children and Adults of Pennsylvania.

Regardless of these concerns, the available evidence makes it clear that normal children, and those below average in various academic functions, derive little help from the exotic and demanding procedures of this program of educational therapy.

Getman. In 1962, Gerald Getman published a text outlining techniques to improve school achievement. This was followed in 1964 by a more elaborate program containing six sections of activities: three concerned primarily with motor tasks, and three describing activities which involve more visuo-perceptual than motor training. It is Getman's contention that as most learning takes place through vision, improvement in ocular functioning will improve classroom performance. Noting that motor and visual processes frequently work in concert, the author recommends that the motor tasks described in his texts be accompanied by procedures to achieve visual control. Situps, for example, must be carried out by first looking at an X on the ceiling while in a backlying position, and then focusing upon a similar X (as he sits up) placed on the floor between the child's legs. "Finger-jumps" are included in the program, which require that the child look from thumb to thumb, held out from the body, and then from thumb to more distant points in the room. The program also contains blackboard work, including the drawing of circles, lines, and similar configurations by both hands at the same time. The training procedures thus require the child to practice a number of perceptual, ocular, and motor abilities, including balance, agility, strength, near and far point fusion, accommodation, ocular tracking, the quick recognition of geometric figures, directionality in the location of figure components, and hand-eye coordinations needed in drawing.

There is little research support for the assumption that reading disability is primarily a visuo-motor deficit. Rather, findings of studies reviewed previously point out that, in many populations of children, ocular problems have little influence upon reading. Similarly, there is little evidence to support Getman's view that various ocular functions are improvable by the methods he outlines.

Three research studies support generally the worth of Getman's methods. One of these is a mimeographed paper mailed with one of his books (Getman, 1963). Halgren (1961), following a ten-week program with 31 control and 31 experimental subjects, found that the IQs of the latter had improved seven points, and they had also improved on the average 2.1 years in reading speed, and 2.8 years in reading comprehension. When describing the methods used, however, the writer made it clear that the methods were gradually modified when individual children's achievements indicated that a change was called for, thus raising questions as to the actual procedures used in each case. Halgren's statistics were also inadequate. No distribution scores accompanied the averages he listed, and thus no test can be made of the statistical significance of the changes he reports. Honzik (1948), for example, has found that the IQs of 60% of the children she studied over a period of years changed 15 points or more due to some combination of experience and/or maturation, while the IQs of one-third of the children she investigated changed by 20 or more points. A change of seven points, then in IQ, even if occurring only over a ten-month period as reported by Halgren, may have been due to factors other than visual-motor training. Lyons and Lyons (1954) report the influence of visual training on three subjects. Improvement was reported in test scores evaluating verbal meaning, reasoning, perception and the SRA Primary Mental Abilities Test.

The research available in support of Getman's procedures is thus rather sparse, while studies containing evidence that groups of children with academic deficiencies may have problems other than those involving eye function are numerous (Krippner, 1964; Eames, 1948; Kinsbourne & Warrington, 1963; Neville, 1961). It is apparent, then, that application of a program of visual training such as that suggested by Getman to large undefined populations of children suffering from mild to moderate educational difficulties is less than sound. Additional evidence is needed before a definitive statement can be made concerning the influence of ocular training upon ocular functioning, while the influence of ocular training on academic achievement has received even less attention by investigators.

VI. Perceptuo-Motor Training.

While the above programs include physical training activities to improve body image and spatial orientation, and place considerable emphasis on exercises for training in motor control and coordination, certain other programs place their emphasis on perceptuo-motor training directed more precisely toward the visual skills of object recognition.

A special program for the testing and remediation of disorders of visual perception in relation to learning disabilities has been developed by Marianne Frostig and her associates (Maslow, _et al_., 1964). The program was developed through the study of a large number of children diagnosed as having minimal brain dysfunction or other learning difficulties. Regardless of the diagnostic category, "Most of the children were found to have visual or auditory perceptual disturbances as measured by such tests as the Bender-Gestalt, Goodenough, Wepman Test of Auditory Discrimination, and tests for aphasia.

"Disturbances in _visual_ perception were by far the most frequent symptoms and seemed to contribute to the learning difficulties. Children who had difficulty in writing seemed to be handicapped by poor _eye-hand_ coordination, and children who could not recognize words often seemed to have disturbances in _figure-ground_ perception. Other children were unable to recognize a letter or word when it was written in different sizes or colors or when it was printed in upper-case print and they were used to seeing it in lower case. It was postulated that these children had poor _form constancy_. Like everyone else who has worked with young children, we noticed that many children produced letters or words in 'mirror-writing'. Such reversals or rotations indicated difficulty in perceiving _position and space_, while interchanging the order of letters in a word suggested difficulties in analyzing _spatial relationships_ (as well as indicating the possibility of auditory-perceptual difficulty). As a rule these latter children could neither read nor spell longer words. It was also observed that many of the children with evident disabilities in visual perception had difficulty in paying sustained attention and/or showed behavioral deviations."

On the basis of these observations, Dr. Frostig and her associates developed a test of visual perception which included five subtests as follows:

I. Visuomotor. In general, poor performance on this subtest is said to indicate that writing will be difficult for the child and that kinesthetic methods, which are widely used in remedial reading, may in this particular case have limited success.

II. Figure-Ground Perception. The child with difficulties in figure-ground perception may have difficulties in sustaining and shifting attention - also rigidity in thought processes. Such a child may therefore need training both in figure-ground perception and in structuring his learning tasks.

III. Form Constancy. Difficulties in this subtest indicate the probable need for exercises in form discrimination, and special methods for the recognition of letter forms. Description and analysis of letter shapes may prove useful.

IV. Perception of Position in Space. The child who has difficulties in this area should need careful help in gaining awareness of the right and left sides of his body, and in the discrimination of position in space in a two-dimensional plane.

V. Spatial Relationships. If a child has disability in this area, his ability to learn to read and spell will be affected. Such a child may improve if he is given practice in constructing words, either by writing them, arranging the printed letters in the correct order or through use of color cues.

In practice Dr. Frostig combines the use of her test of visual perception with the Wepman Test, the Illinois Test of Psycholinguistic Ability (ITPA), and in older children the Wechsler Intelligence Test for Children (WISC). It is her observation that 74% of the children tested by her showed disorders of the visual-motor sequencing test of the ITPA and 72% failure in the figure-ground perception subtest of the Frostig Test.

Dr. Frostig has developed a remedial program for the improvement of visual perception based upon the findings of her test. She emphasizes however that "No one kind of teaching materials, methods, or curricula is the best approach for all the children in a classroom. The ways in which children learn vary greatly, and teaching techniques must take individual differences into account. The use of groups of unselected children in attempting to prove the superiority of certain teaching methods is of doubtful value - for example, assessing the effectiveness of the initial teaching alphabet as opposed to color cuing or comparing linguistic methods with the use of basal readers. In each classroom there will be children with reading difficulties. A single method cannot be best for all these children"(Frostig, 1967).

Several pilot studies have been reported to assess the effectiveness of remedial procedures for the alleviation of difficulties caused by faulty visual perception. Among children selected from a group of kindergarten classes, a small group of 20 children showing low test scores were randomly divided into two training groups of 10 children each. Over a period of approximately 2 months, one group received 18 sessions of 85 minutes each of training according to the program developed by Frostig and Horne (1964). The children in the control group remained with their regular teacher at the time of the training sessions. They followed the prescribed school curriculum, which included some perceptual exercises in all sense modalities.

Upon retesting, both groups gained on the Frostig Test, but the trained group gained significantly more.

For an evaluation of these various techniques it is desirable to know: 1) Do the training procedures improve perception? 2) Does improving perception improve or facilitate reading learning? 3) Is

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time spent in this type of training more productive in learning to read than time spent with reading materials? 4) If beneficial, for which type of child is it appropriate?

A small pilot study (Allen and Dickman, 1966) compared improvement in visual perception of two groups of educable retarded children: one group of ten children received training for one semester with Frostig-Horne materials. A second group of six children participated in the usual school activities. The treated group showed superior gains when retested with the Frostig test.

In another small study, Painter achieved similar benefits from perceptuo-motor training (Painter, 1966). In a controlled study of 20 underachieving kindergarten children Painter demonstrated that a period of training using Barsch's Movegenic Theory program caused significant gains in body image and perceptuo-motor integration as well as in certain components of the Illinois Test of Psycholinguistic Ability (especially auditory and motor encoding).

To test its value in the classroom, Rosen (1966) carried out a study with 637 children in 25 first grade classrooms. In 12 classrooms, regular instruction was complemented with 1/2 hour daily instruction in perceptuo-motor skills. In 13 other classrooms 1/2 hour daily extra reading instruction was provided. Results showed that those who received perceptuo-motor training had improved more in perceptuo-motor skills. The groups who received additional reading instruction had improved more in reading.

For purposes of analysis, the children of all classes were grouped as good, average, or poor readers. The same results were observed with all three groups. These results indicate that perceptuo-motor training is not an appropriate part of a regular classroom procedure either for good or poor readers at the first grade level. Within this study, however, there was a small group of boys with severe reading handicaps, among whom those who received perceptual training showed insignificant but consistant superiority over those receiving reading instruction. Dr. Rosen concluded that this observation deserves further investigation.

The significance of disorders of visual perception in children with reading disability has also been emphasized by Silver and Hagin (1960, 1964, 1967, 1968). In their experiences with a large number of dyslexic children, 8 out of 10 children with reading disability have difficulty with the orientation of visual stimuli in space. In a battery of non-verbal tests of visual perception, disorders of figure-background discrimination, confusion of diagonal figures and defects in the ability to orient a figure in space were prominent findings. They also observed that the adult who had a reading disability as a child still suffers from a figure-background problem.

These findings led Silver and Hagin to undertake a direct attack on the perceptual defects in childhood. "Instead of circumventing them, we should try to train them out." Using specially developed perceptual training procedures, these investigators have demonstrated statistically significant improvement of scores on the Koppitz score of the Bender Gestalt Test and on the marble-board test of figure-ground perception. Oral reading and reading comprehension significantly improved in those children with improved Koppitz scores. Improvement (in reading) was not significant in those whose Koppitz scores did not improve.

In regard to the common reading disabilities of the underprivileged, a report by S. A. Cohen (1969) notes that visual perceptual deficits are very common among disadvantaged children. However, an analysis of the substance of these tests reveals that they closely resemble the performance scales of such standard tests of IQ as the Primary Mental Abilities tests. Scores of the two tests show high correlation.

A number of studies were carried out which involved perceptual training as preventative and/or remedial treatments. In general, Cohen did "not see significant changes in reading achievement as a result of these perceptual training programs."

A test involving recognition of spatial orientation of letter-like nonsense figures did correlate highly with letter reversals and poor reading.

Cohen concludes, "The study of clinical cases and most of the curriculum studies of reading methods that we have done suggest that we do not need to teach most of these visual-perceptual-motor behaviors in order to teach disadvantaged underachievers to read. The last study indicates that, perhaps, we should pay attention to the spatial orientation of letters both in isolation and in sequences. Personally, for me the value of the first two studies was to establish that visual perception of the kind suggested in the measurements used in those researches is of dubious use for someone with an orientation to the reading business. The third group of studies seems to be telling me to teach children to read, not to crawl, or to cross patterns, or to draw triangles. The last study suggests that not dominance, or laterality, or even spatial orientation, in general, but letters and words are the important factors, for I have seen no studies of orientation of nonletter stimuli that generate correlations of .66 and .70 as in this study.

"To put it succinctly, on the basis of present data, I would play the visual perceptual game if I were in the visual perception or the IQ business. But in the reading field, the surest way to get urban ghetto kids to read is to teach them letters and words and to do it thoroughly."

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with enthusiasm for a new method, can play a crucial role, and many studies have demonstrated that the nature of a teaching method contributes less to the outcome than does the ability of the teacher. Unless the evaluation of a treatment method is conducted under the most carefully controlled conditions, and according to a rigid study design, the results must always be open to question.

It is also possible that a treatment regime includes elements quite different from those which form the central theme of its theoretical base. Many of the programs which are directed toward perceptuo-motor training contain significant auditory language training as well, achieved through close contact with the teacher in a small class, and through the use of verbal commands and instructions. This component receives little note, yet the work of Ingram (1968) has demonstrated that deficiencies in language structure and in auditory comprehension and recall are very common among children with reading disability.

Thus, from a theoretical point of view, it is essential, for purposes of evaluation of therapy, to have a clear understanding of the various elements of the experience provided by the remedial procedure. Few research reports provide adequate analysis or detail of the therapeutic regimen to permit such a critical evaluation.

VIII. Conclusions

The above review deals with a number of forms of remediation directed toward improvement of certain basic abilities considered to be essential to learning to read. The programs described are in a sense noneducational - that is, they do not deal directly with instruction in language skills, or more precisely in the study of letters or written language. There is not presented here a single adequate controlled study of a group of normal or retarded readers to show that such a method is superior to reading instruction. This does not prove that these methods have no value. There remains a distinct possibility that some of these procedures are of value for certain children and at certain stages in their development. Such situations are, however, of very limited significance and duration. Repeated studies have demonstrated a high degree of specificity of the learning process. To the extent that the training procedures can involve the use of verbal symbols, they will be contributing directly to the ultimate goal of the educational process. The use of noneducational methods would appear to be justifiable only as a form of preschool preparation in kindergarten or nursery school, or as a brief introduction to the use of a sense modality in the case of a child with a clearly demonstrated specific deficit.

It is of concern that,at this time, the major preoccupation of most of these methods is with visuo-motor skills. These programs neglect the large body of evidence that many children with reading difficulty have shown an antecedent delay in the development of spoken language, and are suffering from a defective language structure. For such children, deficits of auditory perception, temporal sequencing, or auditory memory may outweigh any problems of vision in the genesis of the reading disability.

It must be concluded that there is no panacea for reading disability. For the severely disabled reader, there is required an individual diagnosis and a remedial program which reflects his assets and his liabilities, but which involves the study of language at the earliest practical phase.

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EARLY IDENTIFICATION OF POTENTIALLY RETARDED READERS WITHIN THE SCHOOL SYSTEM

Ruth R. Adams

Introduction

One of the chief unsolved problems of today's schools is the child who is not learning to read. Roswell (1954) relates that "those who have had close contact with children who have experienced failure in school know how miserably unhappy these children are, and are aware that very positive changes frequently take place in their personalities as soon as they begin to experience a feeling of success in learning situations." Inability to read, according to Strang (1969), is still the most important cause of school failure.

This child in the past, as Grace Fernald (1943) found at her Clinic School, was often called "subnormal" by his parents and teachers. In later years he was called "emotionally blocked." Thus, many teachers and psychologists believed that until his emotional problems were cleared up, there was no point in teaching this child to read (Roswell, 1963). More recently maturational and neurological aspects have been stressed (Money, 1962). Here the emphasis is on constitutional factors or those of delayed maturation. Rabinovitch (1962) has suggested that a "basic disturbed pattern of neurologic organization" characterizes some of these pupils. Today the term "dyslexia" has become a popular one to indicate children who, as described by Eisenberg (1962), are "unable to read with proper facility despite normal intelligence, intact senses, proper instruction, and normal motivation."

While it is true that progress has been made in etiological studies and that severe emotional problems, maturational lag, and neurological or constitutional factors might be involved, these labels have been confusing to the teachers who have had to work with young children in the classroom, because few clues have been given them concerning the specifics of classroom techniques essential for remediation. Teachers have merely been threatened by such labels and have stated that "since the case has been clinically diagnosed as 'serious,' classroom learning techniques would probably be ineffective" (Adams, 1966).

Many children, on the other hand, have been sitting in classrooms without being spotted early enough as potential reading failures because teachers have felt that, "diagnosis of the problems of such children as these must be done by the 'experts.'" A typical attitude

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was, "If I can't even tell what's wrong, what can I do to help them?" (Adams, 1966).

Despite this, Roswell and Natchez (1964) state that they have found that "all but a small minority of children can improve their reading through proper help and guidance in school." There are always the exceptional cases, it is true, that cannot be treated in this way. The school must be able to identify such children early in order to arrange for prompt referral. In most cases, however, say Roswell and Natchez, "the reading disability can be alleviated to a large extent in the regular school setting and in many cases it can be overcome completely."

The City College of New York has experimental programs underway in the training of teachers of reading. These programs include courses and field work on the undergraduate and graduate levels and follow-up through in-service training.

Undergraduate Program

Undergraduate students majoring in primary and elementary education are afforded a full year of student teaching in neighborhood urban schools. In these schools, besides the other labels, the terms "disadvantaged or culturally deprived" (Riessman, 1962) have often been applied to poor readers.

The methods seminar in reading is an "on-the-job" seminar. Curriculum evolves from actual teaching problems as students discuss "processes required to read, skills and abilities used in reading, and the procedures used to teach reading" (Robinson, 1966). For discussion purposes, student teachers and their cooperating teachers are presented with a view of reading as a developmental process, involving a sequence of skills related to the decoding of written language and the meanings derived from such a process. The roles of motivation and of reinforcement in learning, as stated in learning theory, are translated into classroom teaching practices.

Students ask, "Why aren't these children beginning to learn to read? Are they slow; is it the home background? What is wrong?" Each student teacher, in seeking some answers for himself, undertakes an evaluation of a child who is having difficulty learning to read. The student teacher then, in conference with his cooperating teacher and his college supervisor, plans a program of classroom help for this pupil. Through the use of such evaluations of the reading of actual children in school, the student teachers begin to discover what the act of beginning reading involves for a young child. According to Feldmann (1969), this means that the child must be able to recognize individual letters and their ordering in space, must discriminate sounds and note their temporal sequencing, must recall both visual and auditory patterns, must integrate these two and perceive the sound-symbol correspondence. The importance of language concepts and basic understandings of language structure also emerge as important to beginning reading.

Student teachers are taught to use the following forms of evaluation:

1. Trial Lessons (Roswell and Natchez, 1964);
2. The Informal Textbook Test (as revised by Elementary Division, Board of Education of New York City, 1964);
3. Informal Tests of Alphabet Knowledge (Durrell);
4. Knowledge of Letter Sounds and Learning Rate Test portions of the Murphy-Durrell Reading Readiness Analysis;
5. The Word and Sentence Knowledge, Numbers, Matching and Copying portions of the Metropolitan Readiness Test;
6. Informal Test of Rhyming Ability (Adams, 1964);
7. Phonics and Structural Analysis Skills Inventory (N.Y.C. Board of Education).

Students teaching pupils on higher reading levels, of course, are taught to use evaluative instruments in areas of meanings, study skills or rate of reading. They are taught different methods, not merely visual, of teaching the child to read which they can use as an outcome of their evaluations. In Wepman's terms (1969), they learn to identify the child's preferred or stronger modality, use a reading approach which capitalizes on this strength, while work is also done to reinforce the weaker avenues of learning. Thus, they learn that readiness for reading instruction, or when to begin reading, is made contingent upon the kinds of instruction available to children (Durkin, 1968). The aim of the college staff in this undergraduate program is to make available to its students a wide range of reading practices and techniques, with the understanding that "reading is tied to the total growth pattern" (Olson, 1949). As Durkin points out, the question is not, "Is the child ready?" but "For what type or stage of teaching?"

As the student teacher progresses, he learns to do a "class profile," or evaluation, and to plan for the needs of many children in the classroom. This latter aspect, leading to a working knowledge of grouping and individualization for instructional purposes is continued during graduate and in-service follow-up training sessions.

In-Service Training

It was found at the Reading Center of City College that in-service training of new teachers by college personnel could help those teachers to attack problems of apparent reading failure early, before the sense of failure in both the child and teacher deepened. A two-year study was conducted by the Reading Center Staff (1968) at one of the campus schools affiliated with the college. This study was conducted under the direction of Professor Florence G. Roswell. Teachers in the first grade of the school and the college staff studied the following topics in an effort to understand the reading problems of the children who were not learning to read:

Body Concept and Self-Image
Gross to Fine Motor Patterning
Gross to Fine Visual Motor Patterning
Auditory Perceptual Patterning
Concept Development
Ability to use Language (Expressive)
Articulation Abilities

Categories were delineated and sub-skills were listed in each category. An attempt was made to develop the listing of the sub-skills in each category sequentially. Graduate fellows and college professors worked with the first-grade children and their teachers. For each skill, techniques of teaching and materials were gathered and tried out. Thus, the curriculum evolved as a teaching curriculum, not one prepared in advance. The teachers watched or worked with college staff members in the classroom and made contributions of their own at weekly meetings. The teachers were able to follow-up in a functional way when the college staff was not teaching the children. At weekly meetings at the college, feedback led to further additions or changes in the evolving curriculum.

A few examples of the teaching techniques used during the first year of the study follow. An attempt was made to strengthen areas in which deficits were seen; at the same time, areas in which children showed abilities were reinforced. For example, in the area of "body concept and self-image," the teachers sat with the children in a circle. She then said to the child sitting next to her, "This is my arm" (pointing). This is your leg" (pointing). The child then said to the next child, "This is my leg. This is your (foot, hand, leg)."

Or they played games, such as "This is my ear. What can I do with it? I can hear." Riddles followed. The children had a chance also to play with a "feeling box" filled with many things to improve their tactile sense.

Visual-motor work began with the children's cutting fringes along the sides of a piece of paper. Some had to work first with "snap clothespins" to get the feel of the motion required. Later they cut corners of paper and still later learned to cut along a line. Cutting was followed by placing and pasting, as fine visual-motor skills began to develop.

Visual-Perceptual Patterning began with the concept "same--not the same--(and later on) different." Objects were compared, sorted, and put into groups. Colorform toys were found to be extremely useful. Children sorted shapes and later reproduced them by copying or from memory. Finally letters were introduced to be sorted and matched, identified by name, and copied (later from memory).

Auditory-Perceptual Patterning began with gross discrimination of sounds--clapping hands, ringing a bell, tearing paper, etc. Children began to "tune in" on what was going on. Lessons followed on sound-sequence as children tapped out rhythms on drums. They listened to rhymes and later "read" pictures that rhymed. All this led eventually to the auditory discrimination of sounds in words.

Concept development began by "acting exercises." Up and down, for instance, was acted out by reinforcing concepts of body parts. "Carmen, put your head down. Lift up your arm, etc." Pupils put blocks of different colors in front of or in back of each other. They examined pictures and objects to see if they were little or big. They said, "This book is big. This book is not big. It is little." From these concepts, comparatives and superlatives were developed.

At the end of the first year, the skills sequence and the teaching techniques developed were reevaluated along with the efficacy of the teacher training, and the Reading Center Staff was asked to continue the study for another year with a new group of first graders.

It had been discovered that the first group showed a marked variability in functioning; thus, it was decided to test the new group of first graders early in the fall of 1967 to see if a pattern of deficits and strengths would emerge.

An experimental edition of a readiness test, developed by Dr. Shirley Feldmann (of the Reading Center Staff at City College) for the Center for Urban Education, was obtained. This test evaluated the following aspects of readiness:

1. Language--including meaning vocabulary, auditory comprehension, and visual comprehension;
2. Visual Perception--including discrimination, left-to-right knowledge and memory;
3. Auditory Perception--including discrimination and memory; and
4. Reading Tasks--including alphabet letters and sight vocabulary.

This test measured levels of functioning in the areas listed above, not just overall ability. Children were tested in groups by their teachers;

individual tests followed for children scoring below a cutoff level in the different subtests.

Again great variability was observed, but one definite trend emerged. Most of the children who needed help, needed it in auditory comprehension and vocabulary meanings, as well as knowledge of letter names. In many cases, the children were those who during their preschool experience had lacked the opportunities for development of those language skills deemed essential to success in school. The skills involve both receptive and expressive factors--both the ability to understand and to use language as an effective tool for communication.

The findings, then, agree with those studies which report a deficiency in the sentence length and structure of the oral speech development of urban disadvantaged children. Deutsch (1966) reported the children he studied to be "poor in syntactical organization." Almy (1964), Bernstein (1960) and Bereiter (1966) all found children who are called disadvantaged to be language deprived. These findings are similar.

As a result of this testing, groups of children were taught, in their classrooms, by their teachers and members of the college staff. The lessons given were related to the deficits shown; but, once again, areas of ability were strengthened as well.

With this first-grade group, a new procedure was introduced for the development of concepts and language structure. The teachers in the class in which these children were placed would eventually be using the "Bank Street Readers." Some, in fact, were already using the readiness units. The teachers' manuals of these readers and the readers themselves were studied and a sequential listing of concepts found necessary for comprehension was developed. These concepts were grouped into four categories and later a fifth category was added. These categories were:

Self-Concept and Body Image
Time, Space, and Number Concepts
Sensory Concepts
Classification and Groups
Concepts related to Language Structure

These concepts were introduced by means of pictures, structured questions, and the reading to the children of library books that emphasized the concept being taught. For instance, the children developed the concept of rhyming--a language structure concept--by hearing nursery rhymes, supplying end-words and by reciting poems into the tape recorder and listening to themselves. Procedures included questions followed by the child's pointing to aspects of a picture and giving yes or no answers; "This is ______" statements and "This is not" statements, group statements, i.e., "This yellow apple is fruit;" and, finally telling parts of the story or adding new parts.

Work was also done with these children in other areas as needed. For example, many of them learned the letter names and later the sounds of many speech patterns. Retesting proved that considerable gains had been made by these children; but, equally important, all the teachers involved felt that they had learned more about planning for the teaching of reading for all children. The assistant to the principal reported that she felt that her teachers had gained a new respect for their pupils. They were not "problems," but were in need of a different or more varied approach.

In a related study at the Responsive Environment Program in Brooklyn (Adams and Litwin, 1968), the use of paraprofessionals in primary reading programs was studied. It was found that such assistants could work with benefit with small groups of children in activities planned by the teacher. It was concluded that the use of such adults in the classroom makes for the possibility of realistic and flexible groupings, as well as affording the child another adult figure for language communication experiences.

In Summary

The teacher in the classroom in such programs as those described by Durrell (1963) and others are being taught to help the non-reader by means of "laboratory approaches in which professors, students (and teachers) share the task of teaching pupils...." As Durrell says, "Handling the reading subskills patterns of one individual is fairly complex, but the classroom teacher is asked to provide for different subskill patterns of 30 individuals with different rates of progress."

When this training is effective, teachers see the seriously retarded reader as part of a total reading picture--a child who will require:

1. More careful on-going evaluation;
2. A variety of approaches leading to independence on his part; and
3. Possible referral for other professional help which can go on concurrently with classroom instruction.

But most of all, it is recognized that these children can be helped through effective teaching.

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SCHOOL AGE PROGRAMS: MODIFICATIONS OF TEACHING METHODS AND MATERIALS FOR TOTAL POPULATION GROUPS

Jeanne Chall

This paper is concerned primarily with what can be done about reading instruction in the regular classroom to help solve reading problems.

In this paper, I have attempted to:

1. Summarize the general state of affairs. Specifically, what are the various modifications in teaching methods and materials currently being proposed and tried? How do they differ from the methods and materials that prevail generally or that have prevailed in the recent past? What evidence is there that the proposed modifications will result in better achievement or reduce the extent of reading retardation or failure?

2. Make recommendations for needed research. What issues need further investigation and how might they be investigated?

3. Make recommendations for practice.

The General State of Affairs

The current state of affairs in reading instruction can best be characterized as one of change and flux. Most of the changes, though, are limited to the beginning stage of reading instruction--the stage of acquiring the basic reading skill--usually the responsiblity of the first three grades of the elementary school. Little change of any significance has been proposed or adopted in the intermediate level (grades 4, 5, and 6) or higher.

What are the changes? For these, as well as for the research evidence, I draw heavily on Learning to Read: The Great Debate (1967). In it I reviewed the research evidence from about 1910 to 1965 derived from the classroom, the laboratory, and the clinic; interviewed proponents of old and new methods; observed classes using them; and analyzed published reading programs representing the "old" and the "new." I also draw on the more recent U.S.O.E. Cooperative Reading Studies, comparing the effectiveness of different methods of initial reading instruction in Grades 1 and 2 (Dykstra, 1967).

Basically, there appear to be four kinds of change: (1) A trend toward code-emphasis reading programs, (2) A trend toward greater individualization of instruction, (3) Greater use of technology (still mainly in the experimental stage), and (4) A change in content.

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I will confine myself mainly to the decoding trend, for that is the only one of the four for which there is sufficient research evidence.

The Trend Toward a Code-Emphasis

This trend was started in our age by Flesch's *Why Johnny Can't Read*, in which he called for a return to a phonic method as the best way to initiate the beginner into reading. Following Flesch came other proposals for other kinds of code-emphasis programs, e.g. Spalding, Gattegno, the linguistic approaches of Bloomfield and Fries, and the modified alphabets.

All of these proposals for modification have much in common. Essentially, although they acknowledge, as do all authors of reading programs, that the ultimate goal of reading instruction is getting the meaning of the printed message, they tend to view the beginning reading process as different from the mature process. To them, the first task of the beginner is one of mastering the alphabetic code, i.e., the system of rules that hold between the writing system and the sound system of the language. Although they have the child react to the meaning of the words and sentences that he reads, their primary emphasis is on mastery of the written code.

Thus, in one way or another, these modifications put a greater stress in the beginning on having the child learn to discriminate, name, or sound the letters. And then they either select the first words on regularity of spelling patterns (*can*, *dan*, *fan* of Bloomfield and Fries) so that the beginner can generate his own rules of correspondence, or they teach the correspondences and rules more directly (Spalding). Or they use for the first year or so an alphabet with additional letters to correspond more regularly with the sound system of the language (Pitman).

These modifications can be contrasted with meaning-emphasis programs that have been in wide use in the United States since about 1920. Meaning-emphasis programs tend to have a different view of the beginning reading task. They do not make too great a distinction between beginning and mature reading. Thus, the major concern is getting the message right from the start, and the child is asked to react to the meaning of printed forms of words, phrases, and sentences.

In an analysis of the two reading series used most widely in the United States during 1962-65, if the teacher followed the instructions in the manuals accompanying the readers, most of the beginner's practice time would be devoted to answering questions on the pictures and the meaning of what is read (Chall, 1967, pp. 200-257).

The words used in the beginning books are highly controlled, limited to the most common words in the English language and judged to be within the child's understanding. Only a few words are added in each lesson. After the child learns to recognize "as wholes," about 50 of these words, he is taught some word analysis skills, i.e., which letter or letter combinations stand for which sounds. But this is secondary to learning to recognize words as wholes and to "reading for meaning."

Let me clarify the distinction between meaning and code-emphasis. These are not "either/or" distinctions. They are relative positions. Actually, most beginning reading programs fall on a continuum with regard to the relative emphasis placed on either decoding or meaning practice. I found this distinction useful not only for classifying the different programs available in the early 1960's, but it helped in understanding the research comparing the effectiveness of methods that went back to 1912. At that time the beginning reading methods vying for adoption and use were "look-say" versus "phonics," "phonics" versus "no phonics," or "thought" versus "sounding." Later, in the 1930's, they were "intrinsic phonics," versus "systematic phonics." And more recently they have become "linguistic" versus "basal reader," or "modified alphabet" versus "basal."

Essentially, though, if classified as meaning or code-emphasis, in relation to each other, some continuity and thus some sense can be made out of what appears at first glance to be a great confusion.

Before turning to the research evidence, it is well to mention that "method" encompasses more than the few points I mentioned above in characterizing the meaning and code-emphasis beginnings. Indeed, what actually constitutes method is itself a subject of much debate and disagreement. Generally, I have used it to refer to the particular sequencing, focusing, and pacing of a given set of stimuli to which the learner responds in order to achieve a given objective or set of objectives. Since the teacher can and does influence the focusing and pacing, and often the sequencing as well, even if published materials are followed, we can see how difficult it can be to study the effectiveness of "a method."

Also, I must add that the various methods and proposed modifications can be classified in other ways, e.g., how much they rely on induction versus deduction for learning the alphabetic code; how they vary in the response modes they require of the learner (whether oral or silent reading, or writing are preferred); how structured they are, etc.

Generally, though, as can be seen from appendix A of Learning to Read, where I presented a classification scheme for describing "methods" and then analyzed 22 programs, the code-emphasis and meaning-emphasis programs tended as a group to fall into certain patterns. For example, most code-emphasis programs had a heavier vocabulary load than meaning-emphasis programs; they tended to rely less on "familiar experience" stories; they tended to rely more on oral reading, while meaning-emphasis programs relied more on silent reading; they taught more sound-letter relationships the first year; and for motivational appeal they relied more on the child's interest in mastering the process of learning to read, than on his interest in the stories and illustrations.

What is the research evidence? Will the proposed modifications toward a heavier decoding emphasis result in better achievement and in fewer reading failures?

The evidence from 1910 to 1965, although not absolutely clear-cut, does indicate definite trends. Those programs that could be classified as having a code-emphasis rather than a meaning-emphasis tended to produce better general reading and spelling achievement. The advantages for a code-emphasis approach held at least through the grades where sufficient evidence existed--the end of Grade 3 or beginning of Grade 4. Too few researchers followed their children beyond the 4th grade. However, on the basis of the evidence that existed, I hypothesized that the advantages associated with an initial code-emphasis would remain, if the reading programs in the later grades were sufficiently difficult to challenge the early superior attainment of the children.

The analysis of the past research suggested a hierarchy of reading skills. While the "conventional wisdom" of American reading instruction from about 1930 on has been that word recognition and analysis are lower-order skills ("mere word recognition" or "word calling" are bad words in most standard methods texts while "comprehension" and "interpretation" are good ones), it appears that for the first few years at least, these lower-order skills are significantly related to the higher-order skills (reading comprehension and speed). Thus, decoding-emphasis which does not always show to greater advantage at the end of Grade 1 in higher scores on standardized reading comprehension tests, tends to do so by the second and third grades. Likewise, meaning-emphasis may have an earlier advantage on tests on comprehension and speed. However, this advantage is not maintained.

There is some evidence, too, that the results of code-emphasis methods are even more beneficial for children of average and lower ability, for children of low socio-economic status, and for children who are "high risks"--those who have a higher prediction of failure.

The research to 1965 did not, however, indicate that any one code-emphasis method was more effective than another. There was insufficient research evidence at that time to say that systematic phonics or a "linguistic" approach or a modified alphabet approach, is superior. Nor was there sufficient evidence to say that one published code-emphasis program is better than another.

The clinical studies tended to support the classroom comparisons. They did not present enough data to indicate whether the actual number of failures produced by either emphasis was greater. Children with reading problems had been taught by both kinds of instruction. Yet it appeared that the problems of those initiated by a code-emphasis were generally less serious and more amenable to remediation. Thus, while code-emphasis does not guarantee that all children will learn to read easily, it seems to produce less serious reading problems.

The trends found from the classroom experiments and clinical studies were supported by the laboratory experiments as well as by correlational studies. Indeed, knowing the names and sounds of the letters in kindergarten or early Grade 1 was one of the strongest predictors of success at the end of first grade in different studies done as early as the 1930's up through 1965, and also in the more recent United States Office of Education studies completed in 1966.

Probably more classroom experiments comparing the effects of different methods of initiating the beginner into reading have been conducted since 1965 than up to 1965. What are the results? Do they support or deny the interpretations I drew from the research to 1965?

Fortunately, Robert Dykstra, one of the coordinators of the U.S. Cooperative Studies has done this for us. He drew together specific data from the Cooperative Research Program pertinent to the issue of effectiveness of code-emphasis versus meaning-emphasis programs, in initial reading instruction. Following the classification scheme for beginning reading approaches devised for the Carnegie Study (See Chall, 1967), he categorized conventional basal reading programs as meaning-emphasis, and linguistic and phonics-first basal reading programs as code-emphasis.

After analyzing these U.S. Office of Education studies that were relevant to this issue, he concluded as follows:

> "Data from the Cooperative Research Program in First Grade Reading Instruction tend to support Chall's conclusion that code-emphasis programs produce better overall primary grade reading and spelling achievement than meaning-emphasis programs. This superiority is especially marked with respect to pronouncing words orally in isolation, spelling words from dictation, and identifying words in isolation on a silent reading test. It is apparent that concentrated teaching of the alphabetic code is associated with improved initial ability to encode and decode words." (Dykstra, 1968, p. 21)

Yet method does not account for all differences. Success within all methods is related to pupil characteristics, to the general school situation, and to teacher characteristics. Indeed, since larger differences were often found in the U.S. Office of Education studies among schools and teachers using similar methods than between those using different methods, Dykstra (1967) in an earlier summary based on comparisons of beginning reading programs that varied in other characteristics than meaning or code-emphasis, concluded that the total instructional setting and the teacher were probably more important for reading achievement than the specific method used.

This conclusion has some support from one of the cooperative first-grade studies directed by Chall and Feldmann (1966). We attempted to find out what it is that the teacher is and does that makes a difference in pupil achievement. Detailed weekly observations of teachers who ostensibly were using the same basal reader (meaning-emphasis) programs showed considerable variation in the way they implemented it. Generally, we found little correspondence between what the teachers said they did and what they actually did when observed. When initial readiness characteristics of pupils were controlled, the following were related positively to reading achievement at the end of Grade 1: overall teacher competence, a thinking approach to learning, providing children with materials of suitable difficulty (not too easy nor too hard), and a greater emphasis on teaching the relation between sounds and letters (code-emphasis).

What can we conclude from the research through 1965 and from the more recent U.S. Office of Education studies? Certainly, that method itself is not a simple matter nor is it a sufficient condition for achievement. Even without the evidence available from these experiments, it is reasonable to expect that teachers vary in their competence and skill in implementing any method; that children vary in their backgrounds, abilities, interests, and receptiveness to different learning tasks; and that schools vary in their expectations and facilities. Thus, any reading program, even if carried out exactly as the author prescribes, tends to vary in its effectiveness. It may well be that a less effective method in the hands of a good teacher may lead to better reading achievement than a more effective one in the hands of a poor teacher. But this does not deny the importance of method.

Individualized Programs

Proponents of this line of innovation are critical of the existing classroom organization which depends on teaching three separate groups within a class (the groups selected by reading achievement) with essentially similar textbook material, but of varying degrees of difficulty. They are also critical of the story content of the existing basal readers, claiming that it does not excite the interest of the individual child.

One group of critics is made up mostly of teachers who favor an individualized reading or a language-experience approach as a way of individualizing instruction. Another group of critics, made up mostly of experimental psychologists, are working for solutions to individualization through programmed learning materials and computer-aided instruction.

Proponents of individualized reading propose the use of a large variety of reading matter--fiction, non-fiction, magazines, newspapers, and textbooks instead of relying solely on text materials (basal readers and their correlated workbooks) taught to small groups. Each child is to select his own instructional material and proceed at his own pace. Because the child selects his own books, it is claimed that they satisfy his vital interest and are of an appropriate difficulty for him. Instruction takes place during short pupil-teacher conferences on the books selected by the child.

As would be expected, the individualized reading programs vary a good deal, with some teachers dispensing with group instruction from basal readers while others give daily basal reading instruction in groups from conventional readers, supplemented by the child's independent reading of non-text materials.

The language-experience approach incorporates the basic features of individualized reading. But it also incorporates one essential feature from the code-emphasis programs--early acquisition of the code, through an emphasis on writing, as the first step in learning to read.

In the language-experience approach, the child's first stories are encouraged through his own artistic productions and are recorded by his teacher. Later, the child writes the captions and stories aided by some instruction in the spelling of common words. The child's stories are edited by his teacher, who teaches him the relationship between the sounds and letters while correcting his misspellings. As with individualized reading, the child is encouraged to proceed at his own pace. And, as in individualized reading, there is much variation in the practice of language-experience, with some teachers making wide use of basal readers and other published exercise materials while others practice it in its pure form.

What is the research evidence? It is more meager than for the code-emphasis trend. A review of the studies comparing individualized or language experience versus group instruction seems to indicate no definite trends. In some studies the "group reading" children seem to be ahead; in others, the individualized reading. When a break is made by I.Q. or the level of proficiency of the child's reading, it appears that those of higher mental or reading ability come out somewhat ahead under an individualized program while those of lower mental or reading ability seem to make more progress under group instruction (Chall, 1965, and Sartain, 1968).

Programmed Instruction and Computer-Aided Instruction

Programmed instruction as applied to reading is also concerned with self-paced and self-directed learning. But the steps are laid out for the learner in a much more structured manner. Each bit of learning is so organized that the next step depends upon learning the previous one, and the pupil gets immediate confirmation of his response.

Theoretically, any approach to beginning reading may be programmed with a meaning or a code-emphasis. However, it is interesting to note that the recently published, programmed, beginning-reading programs are code-emphasis.

Computers are also being used in the teaching of beginning reading. O.K. Moore was probably the first to use a computer in teaching preschoolers (some as young as 2-1/2) to read, type, spell, and write. Moore uses a computerized typewriter as the first tool for teaching children their letters. The children are free to explore the computerized typewriter and when they strike a key, the computer calls the name of the letter or the symbol struck. Later, a teacher presents letters and words to the child which he is to name or read and then reproduce on an electric typewriter.

More recently, Richard Atkinson and his associates at Stanford University have developed an experimental, computer-aided instruction program in beginning reading. It does not claim to be a complete program that needs no teacher. Indeed, it assumes that the child will receive regular classroom instruction and will spend about fifteen minutes daily on the computer program. The computer program has a visual as well as an audio unit. A word or letter or sentence is heard by the child through a set of earphones, while the screen flashes the visual form, and the child is told what to mark, etc. If he is correct, the computer gives him the next step. If he is wrong, the computer tells him he is wrong and gives him different exercises designed to teach him the same thing.

A Change in Content (Stories and Illustrations)

The push toward a change in content stems from various discontents, although the most vocal is the concern with our urban population, particularly with minority groups. While the basal readers for the early

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grades have, in theory at least, contained stories primarily of "real-life experiences," it seems that the real-life experiences of the basal readers did not keep up with the realities of the 1960's. Many critics have claimed that the world of the basal readers--a clean, all white, suburban, upper-middle class world--is virtually a fairy tale to the disadvantated, urban child. Many of the publishers of the most widely used basal reading series have recently published integrated editions, as well as the regular editions. The integrated editions differ from the regular editions, it seems at first glance, only in the illustrations. Even before publication of these integrated editions, several authors and publishers pioneered in the development of readers especially designed for the urban, culturally disadvantaged child.

What is the research evidence here? Actually I could find no studies that indicated a relationship between the content of readers and facility in learning to read, at least at the beginning stages of acquisition of the reading skill. Theoretically, it is assumed that greater identification with the stories will make learning to read more interesting, hence the child will stay with his task longer. The investment of publishers in illustrations, probably the most expensive feature of the readers, would indicate that some positive knowledge of their worth is available. Yet there is no such evidence.

Recommendations for Needed Research

I will start first with the kind of research that is not needed, but only helps to confound issues even further.

We do not need research that compares Method A with Method B, unless it is placed in a theoretical framework and presents sufficient evidence from the existing research that it is needed to nail down points which are still open and crucial, i.e., we can generalize the results.

We do need research on the interaction of certain pupil characteristics (low or high language ability, low or high visual perception, low or high auditory perception, etc.) with certain kinds of reading methods and materials. For example, do high-risk children make good or poor progress with certain kinds of programs, and certain kinds of teachers, and if so, why? These kinds of answers can come only from more detailed and careful observation and testing, not from giving a group standardized achievement test at the end of the year's work.

We need research on specific questions, such as: inducing rules versus direct instruction Is there a difference for unselected population groups and for particular kinds of children?

We need more research on what the successful teacher of reading is and does and on the kind of teacher training that can produce such teachers.

We need to know more about the effect of the content of reading instructional materials, both the stories and the illustrations, on the achievement and attitudes of different kinds of children.

More research needs to be done on the use of simple, inexpensive, self-instructional devices that can be used for practice, especially by the children making slow progress.

More research is needed on the use of paraprofessionals in the teaching of reading, especially with children who are making slow progress.

Research is needed on the nature of the reading comprehension process and the best strategies for teaching comprehension. This is probably the area of greatest ignorance in the pedagogy of reading (the area that has had the least discussion, debate, and change) and the area of greatest need.

One can go on like this, listing the research topics, questions, and gaps in the substantive knowledge of the psychology and pedagogy of reading. But this has been done thousands of times before, with little obvious effect. More research hasn't always brought with it more knowledge; it has often brought more confusion because the quality of the research has been poor. This is not surprising since it has been a part-time interest of a minority of those in the field. Only 1.6 percent of reading experts queried by Barton and Wilder (1964) received half or more of their income from research bureaus or projects. Reading researchers have not only lacked institutional support for quality research, but the schools of education where they study and work have been cut off from contact with research activity in the basic sciences. Furthermore, reading research has not received financial support on the scale and over the period of time required to yield reliable answers to pertinent questions. Therefore, instead of conducting much-needed, high-quality research, reading specialists have turned to teaching courses, speaking at conferences, conducting workshops, engaging in clinical practice, and writing instructional materials for children.

The two greatest research needs are trained researchers and financial support for their work. Adequate training programs for researchers in reading are essential--researchers who will devote most of their professional time to the pursuit of knowledge in this field.

Such training should avoid being parochial. It must be based in psychology, human development, and linguistics. Further specialization may require the study of anthropology and sociology as well as neurology and clinical psychology.

The second greatest need is adequate support for long-term, quality research--research that is broadly based and executed--in projects that include scientists from other disciplines, as well as practicing classroom teachers who are the ultimate users of the knowledge.

Until the field has sufficient, adequately trained scientists who can devote themselves to a career of asking and answering the right questions, the lists of research needs in reading will continue to grow but many of the needs will remain essentially the same as those that have confronted us for the past 50 to 100 years.

Recommendations

1. A federally supported system of fellowships for the training of high-level researchers who will devote their careers to the improvement of classroom practice in the teaching of reading--whether they do their research in the laboratory, the classroom, the library, or the clinic.

2. Federal, state, and private foundation support of programs of research. The field has been deluged by thousands of little, unconnected studies. Each investigator has tended to ignore what went before and what followed. Instead, it is strongly recommended that government and private foundation support be given for programs of research designed to answer a series of interconnected questions that can yield generalizable results.

Also needed is support for periodic, in-depth analyses and syntheses of the "little studies," on a given topic, to serve those who are responsible for the development of instructional materials, for the training of teachers, and for the making of policy decisions about classroom practices.

3. The perennial question, "which method is best" has not been answered sufficiently well to endorse or recommend any one of the existing published programs or techniques. However, the classroom research since 1910--good, bad, and indifferent--does point to the importance of the beginner's learning the relationship between the sound and writing system of the language. Since some improvement in reading standards generally and in the achievement of high-risk children particularly has been demonstrated by the use of initial

methods that fall within the broad category of having a code-emphasis, it is recommended, as general classroom practice, subject of course to the individual situation in a school or class and to subsequent research findings.

4. Publishers should be responsible for applying the best available research evidence in the production of instructional materials in reading and should present some evidence to the schools that their materials are useful and effective in the teaching of reading--and have no negative consequences.

5. More effort and funds should be earmarked to teacher education. We do not yet know what the teacher who obtains excellent results actually does and we do not yet know how best to train such teachers.

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THE TEACHING OF CHILDREN WITH LANGUAGE DISABILITIES - SMALL GROUPS

Margaret B. Rawson

Size of Groups

This paper is concerned with reading instruction suitable for use with small groups, as distinguished from classroom or individual instruction. It is a truism that, although from choice or necessity we teach students in groups, it is as individuals that they learn. Therefore, the kind of student determines the kind of group to which he should be assigned and the kind of method which is appropriate. We can say, in general, that class size should be small enough to permit the degree of individualization needed by its members. Still, for economic reasons classes must be as large as teachers can manage and students can tolerate without such undue limitation of their development as would result in false economy. We are focusing on classes which should seldom exceed four, or, at the most, six, except perhaps in some preventive classes. As a rule, the more severe the problem the smaller the desirable class size. A common practice is to assign three to six hitherto failing students to a teacher for intensive instruction.

Kinds of Small Groups

Teaching and learning efficacy demands that students be grouped with others similar in age, intelligence, and level of instructional needs. Practical considerations of facilities and teaching staff must be met realistically, but placement in a small group loses its advantage and can even become harmful if its group members have capacities and needs that are too different from one another.

In school reading programs there are six common types of instructional settings, with three of which we shall be concerned here. We rule out of consideration, except as reference points, the regular classrooms for pupils making normal progress in what is called Developmental Reading, the Special Classes for intellectually or otherwise handicapped children (except for dyslexics), and the Individual Programs for those students with problems so severe or unique that they cannot be taught well in groups. This leaves Preventive, Corrective, and Remedial types of grouping.

Preventive programs are coming into favor for children who give evidence on early screening tests that they are likely to fail in the ordinary first grade reading program, but whose failure may be prevented by the use of a different teaching method. These groups may sometimes be larger than our specified limit of six students, and can even approach standard classroom size, if the choice of pupils is wise and the teachers have skill and preferably assistants or aides.

Corrective Reading classes serve small groups of pupils whose progress is unsatisfactory and who seem to need more intensive, somewhat individualized work similar in kind to that of a developmental program, groups perhaps as large as fifteen.

Remedial Reading groups are formed in two ways. One is made up of several students, perhaps from different classrooms, having similar types of severe problems who can profitably be taught together or for whom it is not possible for administrative reasons to provide the individual help which wou[illegible] meet their needs even better. The other kind of remedial group may consist of students who have had basic individual remedial teaching of the same sort, have reached approximately the same stage of remediation, have very similar needs, and can move into a small class although they are not ready to return to the regular classroom. Either sort of remedial group should be as small and as homogeneous as possible, preferably six or less. If the remedial teacher has too many students, her attention must be spread so thinly that no one can make much progress.

Classification of Reading Problems
(After R.D. Rabinovitch, 2)

Reading disabilities with brain damage, known or strongly evidenced. These children often have learning disabilities of several kinds. Such children generally require individual or special-class treatment, but under favorable circumstances they may be helped in a corrective or remedial class.

Primary reading retardation is synonymous with dyslexia, specifi language disability, and other well-known terms. These children, or older students, if and when they can profit from group work, should be placed in remedial groups. Their basic needs are less semantic than structural or mechanical, having to do with the coding processes. In mild to moderate cases, preventive teaching can often forestall problems of dyslexic children.

Secondary reading retardation arises from various causes, such as physical illness or limitation, inferior mental ability, causative emotional disturbance, poor or irregular schooling, environmental pathology or disadvantage, or bilingualism including minority dialect. Unless the difficulty is so severe as to require special class or individual treatment, these children are properly placed in corrective classes where emphasis is on building background and comprehension.

Of course, if a child has two or more problems, as many do, he will need the most intensive of suitable treatments. The individual's need must determine this.

Teaching Reading to Students with Special Needs

Teaching strategies--general. As we consider how society (represented by the school) teaches its young (here those who are functioning inadequately) what they must know about their language (here, reading), we see attention focused on particular aspects, with greater or lesser peripheral illumination of the others. The primary focus may be on the message as apprehended by the mature reader--the goal. This is the major emphasis of the Basal Reader systems, common in developmental programs all over the country. To the extent that this approach is suitable to small, intensive instruction classes, it is best used for corrective reading.

If the focus is on the nature of the language itself, the instructional strategy will consist of Linguistics or Phonics, or a combination of these, as the way to master the medium. These approaches have given birth to a wide variety of full and partial programs, some well organized and tested, others with less clear-cut points of view or still experimental. Their use in developmental programs is spreading, and corrective teachers use them either from conviction or because their students need a change of method. The remedial teacher can draw much from them also.

The processor is the center of the third approach, the learner for whom both medium and message exist--how he learns, what is wrong with his learning, and what to do about his inadequacy. One thinks here first of the initial teaching and of measures for preventing problems, then of instructing corrective groups of students with secondary handicaps, and next of remedial groups. Basal readers often have not met the dyslexic student's needs, and so one turns to linguistic and phonic approaches already at hand or works out adaptations of the materials designed for individual or clinical use. Such materials are likely to be strongly influenced by the viewpoint of learning psychologists and neurologists.

Some of these strategies are "approaches"; some are "systems"; each has its preferred method of implementation.

Individual or Clinical Approaches Adaptable to Group Use

Ideally, children in remedial groups are placed there on the basis of careful diagnostic study. As far as is possible, the teaching of each child is determined by his individual needs. This makes it necessary for the teacher to be familiar with a large variety of teaching methods and materials and skillful in their use. She then has resources at her immediate command for adaptive variations within her

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general plan of teaching. In a given group she may use one or another of the plans described here or she may prefer to plan her program systematically, using materials of her own choice which she considers appropriate to her children's needs.

The VAKT (Visual-Auditory-Kinesthetic-Tactile)(3) is the remedial technique most often recommended by people coming into the field of reading disorders from the developmental reading world. When learning breaks down badly enough and morale is low, the student is helped to learn the visual patterns of words he wants to know by tracing with his finger large, written models of these words, while simultaneously pronouncing them, syllable by syllable, until he has mastered them. can write them from memory, and file them in his dictionary box. Further steps are designed to take him to the usual direct visual learning of whole words. In extreme cases this technique is generally employed in clinical teaching of individuals, but its designer used it with small classes for the development of skills in written work. Its emphasis is on whole words, analyzed at most to the syllabic level. The tactile-kinesthetic strengths of the learners are relied upon to help establish the visual patterns, with the auditory-speech mode giving some support. It may be the method of choice for some disabled readers, and may be used in groups if plenty of adult help is available. It does not seem to meet the needs of most dyslexics as well as could be hoped, probably because of its whole-word orientation, its lack of systematic build-up of language structure, and its low audio-vocal involvement.

Lists of words organized in patterned groups (4) provide another individual teaching device which can be used with groups. They usually consist of word lists, arranged in accordance with their sound-spelling patterns, which may be practiced aloud for visual-auditory-vocal reinforcement, and written for kinesthetic support. When one uses these devices, short sentences of known words can be read early; story reading is often delayed until word-skill permits the student to read books near his level of interest. This method has been successfully used with older students whose motivation was strong, as well as with others.

The neurophysiological approach has a forty-year history of use with dyslexic students. It has developed a considerable body of literature, of teachers' guides, and supplementary materials (5). There is not a complete series of textbooks for children, although much reading of appropriate material from other sources is expected. The distinctive features of this approach are: its base in the neurological understanding of the language function; its methodical procedures for teaching by the simultaneous or coordinated use of the senses of sight, hearing, and muscular awareness; its use of phoneme-grapheme correspondences as the minimal units for decoding and encoding language; its systematic, cumulative development of blended sequences, patterns, and language structure; emphasis on the integration of reading, spelling, and handwriting; the substitution, wherever possible, of rational processes for rote memory; simultaneity of cognitive and stimulus-response learning as a hedge against the dyslexic's common and unpredictable failure of automaticity; the combination of disciplined method with adaptability in pace and detail to the needs and interest of the student and the ingenuity of the teacher who can use the program as a base of operations to which other material and procedures may be added. It is not an easy method to master, because it is designed to remedy a complicated and difficult problem.

Originally designed for use with individuals, it has been adapted to the teaching of preventive classes of children identified as reading-problem prone (6). It has been modified also for use with small groups of appropriately chosen students from elementary and secondary schools, a Job Corps Center, a correctional school, adult illiterates in the work-learning program, and others.

Other techniques from the individual treatment field either did not seem pertinent to the small group problem or were fragmentary or derivative.

Texts and Methods from Classroom Use

These are described in a general way, in a progression, as far as is possible, from the most phonic oriented through the linguistic derived to the basal reader programs.

One phonics-oriented text, a teachers' guide only (7), has proven useful as a preventive and first-teaching method. A multi-sensory method, it develops its own special technique and flavor and can be used with large or small groups. Students first learn manuscript writing and spelling, with a scheme of numerical subscripts and superscripts to code the multiple spellings and pronunciations of English. Reading is done in parallel and in whatever texts the class is using. It is a coordinate program which has been found sufficient to prevent or overcome difficulties for children in many schools.

Alphabetic letter cases (8), like type fonts of separate letters or small placques, have long been in use for word building and word recognition. These seem to be of considerable value to dyslexics since their use is informed by neurological understanding of the students' needs for motor, visual, and auditory sequencing. Color coding (9) has been added in some instances. This presupposes good color vision and will need to be used with systematically organized material. There is an unresolved question as to whether its many colors may prove more confusing than the coding problems it seeks to overcome.

One system makes extensive use of color-coding (10) to reduce the difficulties of the English sound-symbol association. It is a logical extension of structural mathematics, but it seems quite as complex as the system it seeks to "simplify." It requires a teacher with quickness and flexibility and, again, good color vision. It is multi-sensory in intent. Small remedial groups (and doubtless others) respond enthusiastically to the interesting novelty of approach. There is sometimes difficulty in transferring skill to black and white on printed pages.

Another extension of a structural mathematics system (11) is a clear, attractive, phonically based series which uses a few color cues for emphasis and shows its understanding of the neurophysiological basis of language learning. It is suitable to either preventive, remedial, or corrective group use.

There is also the English version of a method used in a famed world literacy campaign (12). It is designed for teaching adult illiterates on a one-to-one basis, although there is no reason why it should not be as usable in a group as other phonics approaches. Its code-simplification device is a kind of "Dogpatch" simplified spelling introduced after the decoding process has been mastered. ("Sinss awll men ar brutherz, thay awt to luv wun anuther.") The symbols used to teach letter sounds are drawings with the key picture embedded (S is a snake). A "crash program," generally taught by amateurs of goodwill, it often turns out to be far less simple than was anticipated. For the unschooled without complicated learning problems, it may produce minimum literacy and lead the student further. It is not suited to the needs of dyslexics.

A modified alphabet (13), deliberately not copyrighted, also varies the code, this time by adding characters so that 44 "letters" represent the essential phonemes of English speech. It is claimed that the student learns to use this code with comparative ease and speed and to read the considerable literature printed in it. He then transfers gradually to traditional orthography. This method is having wide trial, and large-scale studies of its effectiveness are underway. Reports are mixed but frequently favorable. Case studies of its use as a remedial method have been presented, but there have been reports of confusion of the multiplicity of symbols, several of the new ones adding more reversals of the kind which give especial trouble to dyslexic children. The simplicity of this concept makes the coding approach acceptable to many teachers hitherto resistant to the synthetic use of letter-sound association.

Several series of texts (14) are similar in appearance to classroom basal readers but have systematic phonics as their pedagogic backbones. The teacher of a corrective class can tell whether these books are suitable for her students, who may require a change of orientation, per se, or have specific learning problems. The remedial teacher will often find stories in these and other phonics books usable because of their sound-related, compatible form of vocabulary control.

The *linguistics-oriented books* are in some ways related to the ones in the phonics category just described but differ in *theoretical background*. Several of them might be *placed in either grouping* (15). They are generally planned as developmental programs, that is, for beginning-teaching in the classroom, but they lend themselves to use in corrective and preventive classes. Because of their progression from structural simplicity to complexity and their vocabulary control by spelling patterns, their material is particularly useful to remedial teachers as adjuncts to their central plans of treatment. Some linguistics series are more ready to admit their kinship to phonics and even to teach letter-sound correspondence than are others.

Programmed reading (16) is a teaching medium or format which can be used by a variety of methods. Its form, however, seems best suited to the sequential, cumulative build-up of learning, either by the rational approach or by stimulus generalization (including principles for action from repeated exposure to their use) favored by both systematic phonics and linguistics. There are several such systems, some in book form and some to be used with mechanical devices. The child is presented with one very simple step forward in the solution of a problem, gives an answer or performs an action, and receives an immediate "right" or "wrong" check. If correct, he moves to the next step; if wrong, he repeats or is given additional instruction--instant remediation--before he proceeds. He goes at his own pace, although he may be working in a classroom, with the live teacher helping as needed. This is technology's attack on a feasible solution of the problem of large-scale meeting of individual needs. It can be particularly helpful with older students who prefer to deal with something inanimate which they know will be neither judgmental, punitive, nor cause for embarrassment.

There are several systems which are allied to *professional linguistics*. However they express it, all emphasize the decoding of print to sound and thence to lexical meaning, taking full advantage of our alphabetic language. They all control introduction of new vocabulary quite strictly by regularity of spelling pattern, and so are useful to teachers of phonics (a "non-word" to many linguists) and to remedial teachers, as well as to those who wish to use their approach more strictly in corrective and developmental classes. Although all of the ones the writer has examined begin by teaching the alphabet, only *one* (17) "lets the child in on" the *phonemes as separate sounds*. This is a pleasantly simple, linguistically sound set of beginner's books, with a brief, forthright and adequate teacher's guide. The *other sets* (18) stress learning words and syllables in groups of minimal contrast pairs (hat-sat, hat-hip, hit-hip) and other pattern groups, spelling aloud rather than sounding, when in doubt. Perhaps this might be called a "sound-word" method (by analogy with "sight-word" in basal reader parlance). Since the words are regular in spelling, many children catch on, as some of the authors hope they will, but there is some evidence that by no means all children make the letter-sound connection without specific instruction. Linguistics readers have few or no pictures to distract the learner from his job of mastering the code.

Basal Reading Programs and Their Variants

A Basal Reading Program, common in most schools. provides a complete series of storybooks, workbooks, accessory materials and often supplementary readers. Teachers' guidebooks give specific, detailed instructions as to what is to be done and said. The emphasis is on sight recognition of whole words of familiar meaning and on interpretation of text and pictures. New words are pre-taught, introduced slowly and repeated frequently in the text. Phonic analysis, as contrasted with synthesis, once entirely absent from some systems, may now be taught but is often not emphasized nor systematized. Format is attractive. Literary quality, seldom discernable in the first books, improves in later readers with the inclusion of stories and book chapters from good authors, but is likely to be uneven. Illustrations are colorful and profuse. Many children learn to read well by this route; many others fall by the wayside.

A teacher with the kind of expertness needed by a corrective class will use only selected items from the guidebooks' detailed instructions, choose volumes suited to the needs of her class, and supplement with other readers or trade books of comparable difficulty, some of them especially designed for remedial use. Her problems will be less if she does not have to go back as far as the early readers whose content is directed to little children.

Basal series are fielded by the major publishing houses and revised frequently for competitive reasons and to incorporate the newest advances in educational understanding of the editors, who are often well-known educators. Most series--at least nine of those examined--have been revised within the past ten years, several very recently.

Sets of additional material (20) are often used in addition to the developmental basal program. Typically, for each general age level (grades 1 through 12) there is a sizable kit box of brief stories, articles, and exercises of varied content and several levels of difficulty, through which each student works his way at his own pace in accordance with his needs. The teacher provides help and guidance, with periodic group instruction. The approach is largely sight-recognition, with some provision for analytic phonics.

Teachers of dyslexic students generally do not find standard basal reader series appropriate main texts, although they often provide good reading matter after a modicum of basic skill has been developed. For some secondary reading disability students (Rabinovitch classification), especially in corrective classes, they may be used intensively. In these cases the remediation consists of using them with greater skill and with the teacher's closer watch on the response and understanding of each pupil. The independence promoted is especially valuable.

Two systems which think of themselves as, like the basal readers, meaning-emphasis: committed are called "Individualized Reading" and "The Language Experience Approach." These are sufficiently unstructured to be used in part in connection with other approaches, although doing so takes considerable adjustment.

Individualized Reading breaks away almost entirely from the text-dominated curriculum, using a variety of bound and unbound reading materials supplied to each child on the basis of his observed needs and interests. Frequently introduced with sight-word methodology, it also lends itself to a combination with other approaches after their early stages of strict vocabulary control have been passed. Heavy demands are made on the teacher's skill, fund of information and resourcefulness, but the method's flexibility makes it a useful component in either a remedial or a corrective program. Care is required to prevent unsystematic discursiveness or superficiality.

The Language Experience Approach (21), often used at the very beginning of other programs to help the child understand the connection between experience and its recording, can be continued as the main vehicle of teaching. Each child and class makes its own reading matter by dictating, and later writing, its experiences. The teacher types or prints these accounts on paper or charts and then uses whatever method seems best to turn them into reading lessons--usually the sight-recognition procedures. Motivation is high, and the method is often favored for corrective groups. Its suitability for remedial or preventive classes is minimal, at least at the beginning, because of its relatively unselected vocabulary.

The foregoing has, for want of space, made no mention of the many technological devices, other than those for programmed reading. The market abounds with machines, special typewriters, films, tapes, discs, reading pacers, tachistoscopes and the like, as well as many small materials, devices, and games which teachers often find most useful in various reading programs.

Also omitted is bibliotherapy--that many faceted motivator, tension reliever, skill developer, and promoter of good reading, the right book, with right content at the right time.

Whatever the method employed and whatever the composition of the class, in almost all cases the teacher is the crucial factor in effectiveness. If she is as good as she needs to be and as free of undue restraint, her primary interest will be in teaching her children to read, not in following a system. She will use a system if it is effective, vary and supplement it as her developed awareness shows the need and her informed skill shows the way to do so. For her a system, or better an approach, is at its best as a foundation in which she can believe and trust and on which she can build her own professional skill and the children's continued growth toward competence in reading.

GLOSSARY

Analytic phonics, or phonic analysis: dissection of words into their syllabic and phonemic elements.

Automaticity: immediate response to (here linguistic) stimuli without conscious thought, as in word recognition in rapid reading.

Auditory reinforcement: (of visual associations) simultaneous looking and saying and hearing oneself say the combination being learned.

Code-emphasis: the teaching of beginning reading as a skill in associating graphic symbols to sounded symbols (words) which carry meaning.

First-teaching: the method or approach used with beginners, as contrasted with remedial teaching.

Grapheme: loosely used in discussing phonic teaching as synonymous with phonogram, q.v.

Intrinsic phonics: generally analytic phonics, q.v., applied to known sight words incidentally to "reading for meaning" in basal-reader type approaches.

Kinesthetic reinforcement or learning: learning through muscle movements, especially of the hand and arm in writing and the vocal organs in speech.

Linguistics: the scientific study of language.

Meaning-emphasis: the teaching of reading from the start as the mature skill of getting meaning directly from graphic symbols at the word, or longer level.

Phoneme: the minimal sound unit which distinguishes one word from another. Can be spelled with one or more letters (as bat from fat, chin from shin).

Phonics: the study of speech equivalents of printed symbols and their use in pronouncing written words (not "phonetics," which is the science of sound in language).

Phonogram: the visual symbol or spelling which represents a phoneme (as f or ph for the sound /F/).

Sight-word or sight-recognition: immediate recognition of whole words, as in mature reading.

Spelling pattern: (linguistic use) identical way of representing a speech sound in a group of words (as catch, fetch, hutch).

Synthetic phonics -- the study of word elements (phonemes of speech and graphemes of writing or print) and the process of their combination into words.

Systematic phonics -- phonics taught by a pre-ordered, or structured, system and generally used synthetically (see synthetic phonics).

Tactile reinforcement -- use of fingertips in tracing letters and words as an avenue of imprinting memory of their form.

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As first circulated, this paper mentioned no instructional materials by name, since it could not hope to give an up-to-date listing of all good and pertinent titles. Here, we list a few typical members of the several categories, with no attempt to be exhaustive nor hope of being fully current, begging the indulgence of omitted authors and publishers, and hoping that readers will find useful leads to the information they need.

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MANPOWER

Mary Austin

In the years following World War II, American society experienced changes of greater impact than those of any previous era in history. All of these changes--the population explosion, the technological revolution, the exponential increase in knowledge, the student and faculty rebellions--have direct implications for higher education. Enormously expanded enrollments in elementary and secondary schools, for example, brought literally thousands of students into colleges and universities. Moreover, increased numbers of pupils at pre-college levels created a growing demand for college graduates to teach them and a great need for college personnel to teach the teachers--a kind of academic multiplication problem.

Institutions currently are pausing to recover their breath, as it were, from this rocketing pace, and many are reexamining their offerings to prospective teachers with new vision and vigor. As a result, interest in the quality of teacher preparation has gained unprecedented momentum. This direction in higher education is long overdue, for studies relating to teacher competence rarely advocate the continuance of traditional pre-service curricula. Such programs are no longer likely to be adequate, according to the Conant report (1963) and the Harvard-Carnegie reading studies (Austin and Morrison, 1961 and 1963); they prepare teachers neither for roles they will be expected to perform in the future, nor, indeed, even in the present. Not only is this true for general classroom instruction but for reading as well. The remaining sections of this paper will focus upon specific steps for improving the teaching of reading through recommended changes in pre-service education programs.

Recommendations for Pre-service Programs

Because excellent classroom teachers are needed, effective screening of candidates for teacher education programs must take place. Initial screening should be conducted by faculty members of the department of education, who utilize admissions criteria above and beyond those established for entrance to the college as a whole. As a continuing screening, institutions should probably consider students' performance in school and community contacts (described later) at each level from freshman to senior years. More institutions than formerly also examine the results of an exploratory teaching period during the junior year. The exploratory experience with its focus upon instructional skills enables college personnel to appraise student potential, and it helps each student reach a decision about teaching as a career. Academic performance and success in student teaching should be retained as criteria in the total selection process.

Programs of the 70's should be designed to overcome past deficiencies at the pre-service and in-service levels. With regard to these weaknesses, the first Harvard-Carnegie study (Austin and Morrison, 1961) made it clear that although college reading instructors had every reason to believe that they would mold future teaching practices of their students, such was not the case. School administrators, college personnel, apprentices, and cooperating teachers alike agreed that cooperating teachers exerted unchallenged influence upon the instructional behavior of beginning teachers. When instructors themselves were invited to enumerate reasons for this predicament, they suggested: insufficient class time for needed course content; absence of opportunities for student observations of skilled teaching of reading; ill-timed placement of the "reading methods" course in the curriculum; apprenticeships which proved to be less than effectual in developing professional competence. Field interviews in 74 colleges further revealed that only about half of the reading staff members supervised their students during apprentice-teaching periods. The remaining interviewees thus had no feedback to assist them in evaluating their own course instruction. The foregoing barriers to teaching effectiveness must be removed. In addition, studies of in-service needs and deficiencies should be made to identify remediably areas.

Obviously, learning how to teach cannot be gained solely from textbooks nor theoretical discussions. Such learning comes by involvement in three areas: the arts and sciences, the professional studies, and the schools. A notable trend toward greater flexibility in requirements is commendable. The arts and sciences offer breadth in such multidisciplinary subjects as psychology, sociology, history, economics, literature, linguistics. Proponents of newer approaches to teacher education seldom assume the doctrinaire position, however, that educators of the 70's should be enrolled in a curriculum which is completely oriented toward the liberal arts. On the contrary, most agree that students who are planning to teach should be exposed to a rich melange of courses while they are acquiring information in depth about the child, the school, and the learning process. Hence, many colleges are moving toward a distribution of study in the arts and sciences over the total training period, rather than adhering to the usual concentration of academic courses during the first two or three years. This trend should be encouraged.

In professional education, psychology of learning and educational philosophy are taking on new dimensions. Sound concepts of growth and development should be vital components of the former, with emphasis upon developmental imbalances as well as normalcies. Cognitive and affective factors need to receive more consideration, as should varying learning styles of individual pupils. Increased attention should be given also to the theories of Piaget and Bruner, accompanied by suggested practices in classroom management arising from these theories. Ideally, too, prospective teachers will be expected to gain information about communication disorders and to become better acquainted with the work of vision, hearing, speech, and neurological specialists. Foundation courses (Introduction to Education) are being enriched by contributions from anthropology, political science, economics, sociology, history, and philosophy--often on a team-teaching basis. Sociology, in particular, can be expected to assume greater importance in the next decade because it holds the promise of clarifying the effect of social determinants on psychological processes. Furthermore, by the year 2000, it is anticipated that 60 percent of the American population will be found in three major urban centers. Hence, prospective teachers must acquire expertise in dealing with problems of low-income groups, especially in developing the language and reading skills of the economically deprived.

New programs should also contain substantial study of evaluation procedures, including the formulation of behavioral objectives, formal and informal tools of assessment, test construction theory and practice, formative and summative techniques, and curriculum revision.

The need for strengthening present courses in reading methodology has been well-documented (Conant (1963), Austin and Morrison (1961 and 1963). Colleges and universities should require at least two courses in reading for those who are preparing for elementary school certification--one in developmental and one in diagnostic and corrective techniques. Secondary teachers should be required to study developmental and remedial reading strategies, with attention being directed to the application of reading and study skills in the content areas. At the undergraduate level, the number of offerings in reading should be expanded to enable education majors who wish to specialize in the communication skills to take elective courses and/or independent study in this area. If, as it seems likely, priority will be placed on upgrading instruction in reading in the primary grades during the next few years, hundreds of additional primary reading teachers and primary reading specialists will be needed.

Severe critics of contemporary teacher preparation contend that the hiatus between what the public expects of teachers and the kind of baccalaureate curriculum provided to meet these expectations is widening, rather than closing. While this may be true in some institutions, newer programs contain certain elements which ultimately will eliminate the distance between theory and practice. Earlier experiences with children in a variety of activities appear to be the real breakthrough to better teaching for which we have been searching. Planned exposure and direct participation from the freshman year on should produce better results. According to this premise, many colleges are providing opportunities for students to serve as tutors, teacher-aides, group workers at settlement houses, etc., and to observe in classrooms and reading centers, perhaps with one hour of credit for each semester. Close supervision by master teachers hired by colleges, possibly on a two-year rotation basis, could provide students with resource people for planning and follow-up discussions of their work with children. Without such available resources, prospective teachers may find their initial efforts both frustrating and haphazard. During the third year, theory and practice should be combined again as teaching candidates observe and participate in regular classrooms and in university and school reading centers. They would also study thoroughly two or three children to learn as much as possible about them physically, socially, and psychologically. Exploratory teaching in the junior year followed by student teaching in the senior year--both under the supervision of master teachers--could do much to reduce the gap between campus theory and classroom practice in those institutions which retain a four-year program of teacher preparation. Throughout these experiences a planned relationship should be developed between student teaching and the teaching of reading. It is especially recommended that there be an intensive experience in one classroom and extensive participation in several classes, thus helping the prospective teacher to acquire a personal teaching style rather than becoming a carbon-copy of one master teacher (Hall, 1968).

Several universities have extended teacher preparation from four to five years, recognizing that maturity and competency require additional time and training. The fifth year of preservice can be devoted to an 18-week paid internship in a classroom supervised by a master teacher and, if desired, a second paid internship of equal length in a school reading center with a reading specialist. Because the focus throughout the fifth year would be on learning by means of examined experiences, there would be opportunities for community study in which the intern could observe and participate in activities in community life, in impoverished areas and others. Involvement would be possible through neighborhood committees and community organizations and during P-TA, school board, curriculum, and teachers' meetings. Bi-monthly seminar meetings with fellow interns, college and public school personnel, followed by group appraisals could foster valuable insights. Throughout teacher preparation, whether undertaken on a four- or five-year basis, greater emphasis must be placed upon relevant experiences, activities, and accomplishments.

Without a doubt, a number of innovations in education during the next decade will be technological (Lowry, 1969). Much conventional course content, whether at pre-college or collegiate levels, may be mastered through new electronic devices. The use of these instructional aids will free professors to devote their time to achieving goals related to higher competencies, values, and social skills. College teachers will learn to use a variety of techniques to make reading practicum experiences and other teaching activities more valuable. Micro-teaching already serves in many programs as an advantageous intermediate step between methods courses and actual classroom work. Used as preparation for student teaching or an internship, micro-teaching is actual teaching in smaller segments, usually for the purpose of concentrating on the development of specific competencies. After viewing a videotape of his teaching efforts, the student may reteach the same concept to a new group and re-analyze his teaching skills. Simulation techniques are fairly recent additions in teacher preparation programs. Many problem situations that teachers will encounter such as teaching strategies, evaluation of learning, and conferences with individual students and/or parents can be simulated.

If we emphasize only the teaching process and the imparting of knowledge throughout teacher education programs, we can fail--and fail miserably--despite indications that "the program has been an eminent success." Focus upon teaching procedures and the dissemination of information makes sense only in an unchanging environment, according to Carl Rogers. Because we live in a time of dramatic change, we must place greater emphasis upon conditions which facilitate learning--in other words, upon helping teachers understand how, why, and when the child learns, and how learning seems and feels to the child from the inside. An important condition, obviously, is the quality of interpersonal relations between facilitator and learner.

Arthur Combs (1965) points out that the problem of learning always involves two aspects: providing new information or experience and helping the learner discover the meaning of information for himself. In the past, we have been so preoccupied by the provision of information that we have actually fostered human problems through failure to help students develop personal meanings. Somehow, we must make certain that teachers gain meaning, as well as facts, from their training so that they in turn will impart these attitudes to pupils and colleagues. Teachers generally, and reading specialists particularly, need to be more concerned about the person involved in the process of learning, if they are to experience success in facilitating the discovery of personal significance of reading as a lifelong activity.

If, then, as research shows, teaching is primarily a process of human relationships, acquiring personal meanings from information and communication, teacher education programs should increase their emphasis on group relations by exposing and sensitizing teacher candidates to the subtleties of personality structure. Group dynamics, counseling techniques, and sensitivity training should become more prominent in future curricula (Hamachek, 1969).

Hamachek, in reviewing research on teacher effectiveness, indicates the importance of instructional procedures and interaction styles as determinants of superior teaching. In both of these areas, Flanders (1968) has contributed to our knowledge, and his findings should be included in undergraduate preparation programs. Effective procedures for working with groups and/or individuals should be developed through involvement in and examination of techniques employed in interaction analysis. Practicum experiences should be provided in cooperating schools.

Summary

Several suggestions for strengthening pre-service programs have been made. Some of the recommendations proposed have been implemented, but others have not. Those deserving of priority consideration in training excellent teachers of reading include:

1. Evaluation of the effectiveness of the whole spectrum of preparation for beginning teachers of reading in order to overcome pre-service deficiencies;
2. Conducting of follow-up studies to determine the needs of in-service personnel as a basis for revising collegiate offerings;
3. Extension of teacher preparation from four to five years to ensure a broad foundation in liberal arts and sciences as well as intensive professional training and experiences,
4. Recruiting and selecting of potentially outstanding career teachers;
5. Reconstituting of professional courses to guarantee relevancy for teaching needs, i.e., psychology of learning and introduction to education;
6. Provision of earlier experiences with children in tutorial, teacher aid, group work activities;
7. Requirement of a minimum of two courses in reading for elementary school certification, one in developmental and one in diagnostic and corrective techniques;
8. Requirement of a course in secondary reading for certification at the high school level;
9. Offering of elective courses and independent study in reading for undergraduate education majors who wish to specialize in this area of the curriculum;
10. Broadening of content and methodology of developmental reading for prospective elementary teachers to provide

more attention to both primary- and upper-grade instructional procedures;

11. Emphasizing of student teaching or internship experiences in realistic classroom settings under the supervision of qualified master teachers;

12. Working more closely with public schools in establishing optimal conditions for student teaching;

13. Incorporating new techniques of micro-teaching, simulation, and verbal interaction analysis to help teachers develop a personal teaching style;

14. Recognizing that teaching is a process of human relationships by including undergraduate experience in group dynamics and counseling techniques.

Several of the above items are employed in one or more colleges throughout the United States. Needed now is a period of acceleration in which priority consideration is given to concentrated inquiry and in-depth development of dramatically better professional practices in pre-service education.

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DEVELOPMENT OF COMPETENCIES FOR THE TEACHING OF READING TO CHILDREN WHO HAVE NOT LEARNED UNDER CONVENTIONAL PROCEDURES

Empress Y. Zedler

The purposes of this paper are (1) to point out the problems and issues involved in the preparation of teachers of children who are unable to learn to read by conventional methods and procedures, and (2) to suggest some possible solutions. The writer has undertaken the task with a modicum of confidence based upon (a) fifteen years of experience in the study of such children and the training of their teachers in a college setting, and (b) the results of a two-year research project in which scholastically underachieving pupils, who were taught by teachers specially trained and supervised in using unconventional, as well as traditional, methods in the teaching of reading, made significantly greater gains in academic achievement and mental function than the control group, whose teachers did not have this special training and supervision (Zedler, 1968).

It is important to understand what constitute "conventional methods and procedures" by which certain children do not learn to read, and from which the specially trained teacher is taught to depart. In 1962, Chall began a scientifically oriented inquiry into and critical analysis of various methods - old and new - of teaching children to read. She succinctly delineated eight principles which, since 1930 and before the early 1960s, "were incorporated in the most widely used basal-reading series and teachers' guides; ...have been taught by college teachers to future teachers of reading; and ...have been followed by most classroom teachers" (Chall, 1967). These conventional principles are as follows:

1. "Right from the start" a major goal of reading is not only recognition but also comprehension of the words and their application to life situations.

2. At the beginning of the reading process the child is expected to read whole words, sentences, and stories related to his own experiences and interests. Such reading is expected to be accomplished "in silence" without benefit of audition or kinesthesia. Anyone closely associated with beginning readers in primary grades, especially those whose teachers were trained prior to 1960, knows that oral reading or "lip moving" is not only discouraged but soon becomes an academic misdemeanor for which the child is penalized.

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3. Phonics (the association between letters of the alphabet and their sound values) and structural analysis (dividing a word into subunits) are introduced as methods for recognizing new words only after the child can recognize about fifty words "at sight." Phonics is often introduced as the method to be used only when all others have failed, a more preferred method being to make an intelligent guess from clues provided by pictures and surrounding words.

4. Instruction in phonics is introduced but not emphasized in the first grades, gains impetus in the second and third grades, and, along with other methods for recognizing words, is spread over the fourth, fifth, and sixth grades.

5. The isolation of phonemes or speech sounds, the synthetic blending of sounds to form syllables and words, and the application of phonics out of the context of meaningful connected reading are undesirable procedures and are to be avoided.

6. The words most frequently used in the child's functional listening and speaking vocabulary are to be repeated often in reading texts through the first, second, and third grades.

7. Reading in the first grade should progress slowly, deferring always to the "readiness or preparatory period," the length of which is determined by teacher judgment and scores on standardized readiness tests.

8. Children should be instructed in small groups selected for homogeneity of achievement in reading.

Most of the children being classified as dyslexic are those whose teachers in the primary grades have tried but have failed to teach them to read by methods and procedures based upon the eight conventional principles delineated by Chall. The question always exists concerning how much of the reading failure is due to initial teaching methods and how much to the constitutional characteristics of the child. There is good evidence that both are involved. It has been well demonstrated and well documented, however, that children with adequate sensory, emotional, and intellectual equipment who have failed to learn to read can be taught, and subsequently can achieve academically with classmates, by methods and procedures which are utterly contrary to any one or more of the conventional principles for the teaching of reading (Orton, 1937; Fernald, 1943; Davis, 1964; see Chall, 1967; et al).

Since 1960, as Chall (1967) points out, many innovative reading programs have been and are being implemented to answer the current widespread concern for the child with reading problems, and for more effective teaching of reading to all children. The phonics approach is being taught earlier, more directly, and more thoroughly. Knowledge of linguistics--the scientific study of the nature of language--is being utilized to emphasize learning of the alphabetic code, as opposed to obtaining "meaning" as the first step in the teaching of reading. Modified alphabets are being introduced. The patterns of classroom organization are changing to emphasize individualized instruction, each child's unique interests, structured environment, and self-directed teaching. Basal reading materials are being programmed into interdependently successive steps, with built-in confirmation of responses immediately available to the child. In some instances the content of reading material is being altered for more realistic racial and socioeconomic appeal; in others, there is no meaningful content; and other procedures present for reading only those utterances which the child has initiated in spontaneous speech. Other beginning reading programs are being developed by interdisciplinary teams of psychologists, linguists, educators, and those interested in computor-assisted instruction. Throughout the profusion of new approaches to the beginning teaching of reading are noted certain common trends. These are (a) emphasis upon learning to break the printed code of language, as opposed to emphasis upon "meaning" while assuming that the child knew the code or would discover it on his own; (b) emphasis upon starting the teaching of reading at an earlier age than the conventional six or six and one-half years, with the discovery that much younger children can and do learn to read, thus challenging traditional concepts of "readiness"; and (c) emphasis upon individualized, diagnostic, and prescriptive teaching.

The recent innovative surge in the United States toward literacy and greater academic achievement for all challenges schools of education to innovate effectively their training programs for teachers of beginning reading. All children must become more skillful readers and at an earlier age. Those who are potential reading failures must be detected before they have experienced school failure with its ego-shattering consequences. Immediate procedures must be initiated for such children to enable them to learn to read, if not by the same methods, hopefully by the same time as their "normal" age-mates. Such preventive procedures should not carry with them stigmatizing labels, nor should they require isolation or homogeneous grouping away from the rich, stimulating environment of the regular classroom (Zedler, 1968). If a child requires individualized teaching it should be done

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as a part of the general educative process, and carried out either by or under the direct supervision of the regular classroom teacher. To meet these requirements, the teachers of young children must have a different kind of professional preparation.

If the child with dyslexia or related reading problems does not have the advantage of a knowledgeable, skilled, and experienced teacher when he is first attempting to learn to read, he will become an educational casualty in need of time-consuming, and not always successful, remedial or special education. The challenge to education is not to wait until the child has failed under conventional procedures, but to teach him effectively from the start. With adequately trained, skillful teachers in kindergarten and primary grades, much of the derogation to child and family and the expense to society of homogeneously grouped special education classes could be eliminated. It is toward the preparation of such teachers that this paper is addressed.

It is paradoxical that teachers should be trained in a remedial capacity to serve pupils who have failed to learn, when the same teachers might have been trained in a fundamental capacity to prevent such failure. To eliminate this paradox, teacher-training colleges and universities will need to provide, and accrediting agencies to require, a more sophisticated, less pragmatic type of preparation for all teachers of young children. Such training should provide teachers with a clearly defined orbit of competence, enabling them to recognize and to meet individual differences. Emphasis in teacher training must move from "how to teach children to read" to the more fundamental knowledge of "how children learn to read." Administrators, supervisors, and teachers feel they have been inadequately prepared to teach children how to read when conventional procedures fail. They are disenchanted with in-service courses, conferences, and lectures. They are demanding the type of fundamental college training which will prepare them to consider and to evaluate new ideas. They would like to become active participants in high-quality research, designed not to prove biases but to explore new frontiers. These are the challenges facing teacher-training programs today.

The literature reveals little relative to the preparation of teachers of children who fail to learn to read, but it abounds with descriptions of methods purported to be effective in such teaching. The positive effect of the reporting and extolling of methodology has been only to emphasize that, with a high level of competence on the part of the teacher, such children can be taught to read. The negative effects have been to lead teachers inadvertently "down the garden path of beguiling but randomly selected devices and techniques" (Hardy, 1966), which are presumed to be panaceas for reading disorders, and to make of educators "simple-solution advocates."

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Publications describing meritorious methods and successful projects have not delineated the broad, eclectic background of knowledge and skills and the extensive, expertly supervised experience which the teacher must have before she can successfully teach beginning readers with specific learning disorders. To meet the present urgent demand for teachers of such children, education, at best, has adopted the pragmatic approach of identifying and recruiting already successful teachers of primary grades. These teachers are given "specialized training" by means of seminars, workshops, and short courses designed to acquaint them with remedial, "special" procedures. Following such training, these previously successful teachers are often frustrated to discover that, while the special system they have been taught may have been successfully used with some children, it does not meet the needs of the pupils assigned to them for special teaching. Too frequently these teachers are disenchanted with their special assignments and request return to regular, general classroom teaching where they felt secure in their abilities, and where their skills did not require embedment in unique conceptual understanding. Although their brief, super-imposed training may have explained what to do, it failed to explain why and when to do it, nor did it provide sufficient expert supervision during confrontation.

Recent literature (Cruickshank, 1966, 1968) has pointed out the need for upgrading and standardizing the preparation of teachers for children with neurologically based learning problems. It is unfortunate that, when teacher preparation is discussed, the issue is clouded by argumentation and discussion regarding definition, terminology, etiology, and related but not educationally pertinent disciplines. It is not surprising that many educators get the false impression that teachers of children with specific learning disorders, such as dyslexia, must function as generalists, taking on the characteristics of other disciplines. Thus we find would-be teachers of the basic school subjects--reading, spelling, and arithmetic--without clearly defined role concepts, attempting to function in psychology, sociology, neurology, pharmacology, and the teaching of motor skills, concerning themselves superficially in these complementary areas in an evasive search for the answer to children's reading problems.

Responsibility for this confused concept of the teacher's professional role must be assumed by the colleges and universities where the teachers were trained. They were not provided with basic knowledge of the total communicative process, of which reading is but a part. When faced with Bloomfield's (1933) definition that the first step in learning to read is essentially learning a printed code for one's native speech, they react with doubt or disbelief, because linguistics and psycholinguistics are foreign fields to them. When they hear that research seems to support an initial code emphasis over a meaning emphasis for producing better overall readers, they are resistive; for they understand the concept of meaning, but the decoding-encoding concept is a mystery to them. When they are given experimental evidence regarding the value of systematic phonics when presented earlier, in greater concentration, and used for synthesis as well as analysis in the teaching of beginning reading, they are fearful and feel more secure in "look-say" methodology because they do not have thorough knowledge of phonetics, (the scientific study of speech sounds). Too often they have been told in college that "research supports" traditional principles, and "is against" new concepts and change; but they have not had the opportunity to analyze this purported research nor to participate in well-planned, unbiased research which might mediate experimentation and change.

Teachers of beginning reading who, while in college, acquired a broad, thorough, basic knowledge of the total communicative process can, according to Hardy (1960), "develop an operational framework to help them understand...the complex interrelationships between hearing, language comprehension, and expression, seeing, reading, speech, written language, and spelling." They will then be "prepared to develop total programs that are effective in meeting a child's capacities and incapacities."

It is noteworthy that most children in school learn to read and do written spelling regardless of the quality of their teachers' professional training. This phenomenon supports the theory that reading and writing are but tools for recording speech (Bloomfield, 1933). Most children have learned the auditory-oral language code thoroughly and involuntarily during their preschool years, as evidenced by their facility in speaking and in understanding the speech of others; therefore, they have relatively little difficulty when they must learn voluntarily to substitute visual printed symbols for the speech of others, and to transpose their own speech into graphic symbols. But the child who has not adequately learned the auditory-oral language code has great difficulty learning the visual-graphic code. Longitudinal studies show that children who fail to learn to read, under conditions in which age-mates do learn, were often delayed in the development of speech, had difficulty understanding speech, and eventually developed speech which was disordered at the phoneme, morpheme, and/or syntactic level (Hardy, 1966; Birch, 1964). Those who would teach such children to read should also be knowledgeable about the ways in which speech is normally acquired and in the causes and treatment for disordered speech.

Children with language disabilities do not seem to perform cognitively as others do. Their abilities to process sensory data, to categorize, to form memory patterns, to abstract, and to imagine are often not functional or adequately controlled. They can learn to understand speech, to speak, to read, and to write if they have sophisticated teachers who are knowledgeable about the nature of language and the learning process, who are skillful in evaluating and circumventing language disorders, and who are supported by expert supervision in their practicum.

The adequately prepared teacher of beginning reading will have acquired a broad background of basic knowledge in (a) developmental psychology, (b) theories of learning, (c) individual differences in cognition, (d) linguistics, (e) psycholinguistics, (f) phonetics of the native language, (g) normal language development in children, (h) neurophysiology, and (i) language disorders - their description, etiology, diagnosis, and treatment.

Based upon these conceptual understandings, the student-teacher can then acquire professional skills within the controlled, supervised environment of the training center's curriculum. These skills will include (a) observing and interacting with children; (b) teaching basic school subjects to normal children; (c) diagnostic teaching of children with learning disorders; (d) analyzing the structure of subject matter to identify a child's ability to learn it; (e) appraising, selecting, adapting and creating methods, materials and devices to meet each child's needs; (f) establishing good working relationships with children individually and in groups to enable them to learn; (g) understanding allied professions; (h) evaluating the results of their teaching and making constructive use of their own mistakes; (i) organizing observations into meaningful reports which can be used by others involved in working with the child; (j) protecting at all times each child's dignity and self-respect, constantly communicating to him that there is help for him until he is able to achieve.

Such knowledge, competencies, and skills do not come from experience and graduate status alone. Nor are they acquired from brief seminars, in-service workshops, short courses, visiting lecturers, curriculum guides, textbooks, and bibliographies. They come from a well-planned, five-year program in a college or university with a department dedicated to preparing sophisticated, expert teachers of beginning reading, who can recognize potential learning disorders and circumvent them before a child has failed to learn.

Graduate status is generally considered to be a necessity before full competence can be attained. The capability of undergraduate students majoring in elementary education to understand scientific information is generally underestimated by those who prepare and present the curriculum. The fervor to be practical and to meet the ever-increasing demand for elementary teachers has contributed to a nonintellectual professional group of educators of young children. Such teachers react in various ways to the great body of background knowledge which they failed to acquire as undergraduates before they were catapulted into "utility" courses. Some of them are in awe of that which they do not understand. Others hold theoretical concepts in disdain because they are foreign to them. Still others do not know that they do not know; therefore, they become "one-solution advocates" for their pupils' learning problems.

At the undergraduate level of teacher training, students' naive beliefs about language, child development, and human behavior in general--both normal and aberrant--should be challenged. The challenge should come through mastery of the conceptual systems advanced by eminent scientists--Piaget, Werner, Erikson, Havighurst, Skinner, Bruner, Zigler, and Chomsky--to name but a few. The student should understand that the purpose of such background knowledge is erudition, not immediate use. Only erudite teachers have the right and the competence to reject and to accept concepts, and thus to construct for themselves frameworks for understanding children, for assessing abilities and inabilities, and for modifying behavior.

During the period of acquiring concepts, student teachers must learn that the erudite teachers of today may become the uninformed teachers of tomorrow unless they keep up with the ever-growing body of knowledge in behavioral sciences. The instructional staff in colleges and universities should constantly assess their own concepts, and subject them to challenge in the light of new knowledge. Too frequently, the background knowledge of the teachers of teachers is woefully limited, fixated at the level of their own dissertations, stultifying experimentation and change. It should be the obligation of college and university instructional staff in schools of education to keep themselves and their students involved in the all-important task of validating hypotheses about children and how they learn.

Before student teachers are placed into practicum, they should observe master teachers in classroom and in clinic. They should have the opportunity to participate as observers in all facets of regular, diagnostic, and therapeutic teaching of basic school subjects to young children. College courses requiring observations from students should be reevaluated often and strengthened. Too often such courses make mockery of intent. Observing students should be as carefully supervised and guided in their observations as they will be in their practicum. They should have ample opportunity to discuss, to question, and to confer about what they have observed.

Student teachers can accomplish their skills only through confrontations. They will make many mistakes, but from their mistakes they can learn if they are carefully supervised by expert college and university personnel, who have previously planned and initiated the training program. It is a mistake to abandon the student teacher in practicum, leaving him to the strategies, however well intentioned, of in-service personnel. The training center must stay in close touch and be ever available with helpful advice and constructive criticism.

In supervised practicum, the student teacher should teach normal children to read; should evaluate those whose learning is below the norm; should devise techniques and materials, and create situations in which each child can learn; and should teach children with learning disabilities in classroom as well as clinical setting. The practicing teacher can feel secure while developing these competencies, if they are based upon previously acquired erudition.

Children taught beginning reading by such teachers will not develop frustration and depression from failure. Their competent teachers will be able to teach them coping tactics. Those children to whom the reading process is most difficult will persist with the feeling that they can learn because they have teachers who are capable of teaching them. The challenge, however, is to the colleges and universities to develop the kinds of training programs which can produce such teachers.

In summary, the training for teachers of children who cannot learn by conventional procedures should not be a superimposed program, but should begin at the undergraduate level and proceed at least through a fifth year. The goal should be prevention rather than remediation; therefore, the teachers should be prepared to teach at the kindergarten and primary grade levels. Student teachers should first acquire a broad, eclectic background of knowledge from which they can develop frameworks for understanding (a) children who learn normatively and those who do not, (b) the nature of language which the child must learn, (c) the learning process itself, and (d) the pathologies of language and learning. Out of such knowledge student teachers should develop skills (a) in evaluating learning abilities; (b) in regular, in diagnostic, and in therapeutic teaching; (c) in relating to and strengthening the self-concepts of children with learning problems; (d) in communicating with related professions; and (e) in evaluating and participating in quality research. During the development of these specific skills, student teachers should be skillfully supervised by college and university professors with high degrees of competence in their areas of supervision.

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NEW TRENDS IN READING
Measurement and Evaluation of the Primary Components of Reading

Norris G. Haring

Reading is a complex behavior for a child who is just beginning to learn how to read, and the teaching of reading is a complex behavior for a teacher. The complexity of the behavior for both teacher and student is complicated by the variables of the teaching-learning situation--the number of different textbook series from which the teacher must often select just one, the motivation of the child, the consequences that follow his reading behavior. Educators are becoming increasingly aware of the effects of these variables on the child's acquisition of that complex set of behaviors that is known as reading (Harris, 1969; Dietrich, 1969), and researchers are beginning to develop ways of more precisely assessing the effects of these variables (Staats, 1965; Haring and Hauck, 1969 a,b). The new trends in reading instruction are toward considering reading as an observable behavior which can be quantified, measured, and changed as variables in the environment are changed. They are oriented toward precise measurement of rate of behavior and careful control over environmental variables. Under controlled conditions, the behavior of reading can be studied and effects of changes in conditions can be observed. Experimental analysis of the process of reading and the conditions that affect it will do much to make the task of reading instruction one that can be performed more effectively and efficiently by a teacher.

Case Studies

Past trends in reading instruction have developed largely as the result of a number of major case studies (Gray, 1922; Gates, 1922; Monroe, 1932; Orton, 1937; Fernald, 1943; Robinson, 1946). These case studies have shared several characteristics. First, although no single cause of reading disability was found, the subjects were groups of children with reading problems which primarily involved word recognition and analysis. Second, new methods of reading instruction were developed to teach the essential skills that the students had previously failed to learn under other methods. Third, the rationale for change in method was that one mode of sensory input must be lacking and could be substituted by another mode. Fourth, each method was considered an effective way to teach, or at least to remediate skills, and each contributed to the expenditure of effort involved in trying to discover the "best" method. While each method can be used as a component in a reading program, no method will ever prove to be the best method for all developmental or remedial readers.

New Directions

Since 1955 trends in reading have come primarily from research on beginning reading instruction and early discrimination of features of the alphabet. These trends have included phonic and linguistic innovations (Bloomfield, 1942; Fry, 1960; Fries, 1962; Lefebvre, 1964), initial alphabet systems such as ITA, Moore's (1963) responsive environment, individualized reading, the language experience approach, the Montessori Method, programmed learning, and content changes in basal readers to motivate young readers by bringing the stories closer to their experiences.

Innovative programs are being developed that systematically sequence pre-reading and initial reading skills, based on the identification of stimuli which evoke appropriate reading responses. As examples, Chall (1967) cites three programs: (a) a first-grade reading curriculum at Cornell University based on theories of learning and motivation; (b) a flexible, sequenced self-instructional reading program at Harvard University that includes instructions for implementing the program as well as diagnostic and criterion measures for evaluating individual students; and (c) a computer-based program at Stanford University which promises to be a significant variable in accelerating instructional refinements. More than their predecessors, the three programs emphasize early decoding of the stimuli basic for word and sentence reading and intensive individualizing of instruction. The systematic approach to initial reading is undoubtedly their greatest contribution to the field (Chall, 1967).

Challenges Facing the Field

The reading process can be viewed as comprising observable and controllable variables, and reading specialists view their primary challenge as being that of becoming more precise in teaching procedures and in classroom evaluation and research.

Specifically, reading specialists must develop:

1. Precise methods of evaluating instructional materials;
2. More functional instruments of measurement for classroom use;
3. New research methods and procedures to investigate already known problems; and
4. Individualized instruction.

In the classroom, the child's performance furnishes the basic data for the teacher to evaluate instructional materials and classroom conditions as they relate to the development of reading skills. The rate of performance can be used to assess the effectiveness of instructional materials for each child. If a high and accurate reading rate drops too far when the child is given a new textbook, there is an indication that the textbook is too difficult or simply not appropriate. To be able to make this kind of assessment the teacher must have an accurate and continuous measurement of rate of performance. Research efforts have recently been producing new and increasingly sophisticated methods of measurement and analysis of data on behavior (Kunzelmann, 1968). And research designs using controlled manipulation of variables reveal the way in which these variables can change behavior.

Variables in the Reading Process

Reading has been variously described as "a reasoning process" (Thorndike, 1917), "communication with an author" (Strang, 1942), or "obtaining meaning from the printed page" (Harris, 1956). More specifically, it has been defined as a set of differential responses to stimuli which have become discriminative to the child (Staats, 1965; Moore & Goldiamond, 1967). Goldiamond and Dyrud (1966) describe reading as the process of "bringing the linguistic behavioral unit under the control of textual stimuli [p. 96]."

The basic process of reading involves the recognition of symbols (Fries, 1962; Gates, 1969; Staats & Staats, 1962). The child learns to associate sounds and letters, and he learns that letters go together to form words. He must, then, learn to discriminate one letter from another and one word from another. The letters and words become discriminative stimuli which control his behavior. In the presence of a written letter A, he should always say A. A stimulus becomes discriminative when a response has been reinforced in its presence. The reinforcement may be in the form of praise from a teacher or parent, or simply enjoyment that the child may feel in learning. When the child attends to the relevant features of a stimulus, he learns to discriminate and thereby to read. Relevant features are the configurations or characteristic shapes of letters and words. The learner need not pay attention to the fact that the word is typewritten, or written in green ink on purple paper, or written in all small letters. He must learn to discriminate those features which make it the word *yes* instead of the word *no*. Definitions of reading depend primarily on one's viewpoint of whether initial reading should emphasize a decoding process or a process of obtaining meaning. The important feature to consider in these definitions is that the closer they come to the identification of observable responses to specified stimuli, the more possible it is to measure those responses and to use the data in evaluating the influence of specific reading stimuli. The responses are under the control of three classes of variables in the child's reading environment: the reading materials presented (antecedent events); the responses to antecedent events; and the reinforcing consequences immediately following performance.

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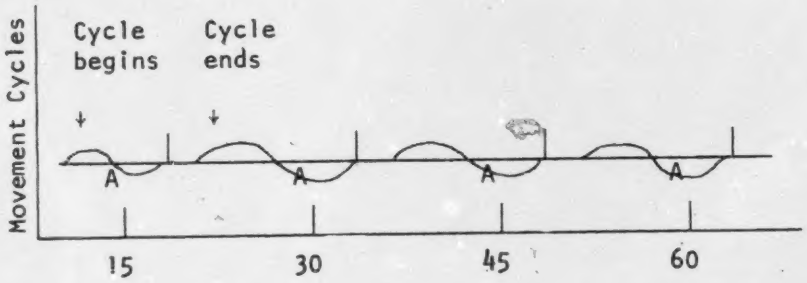
Antecedent Events

Since reading instruction is task oriented, one responsibility of research and instruction is to identify and order these tasks in a developmental sequence. The many cues presented in these tasks evoke the responses involved in learning to read. So that the responses can be measured, they must be observable, specifically defined, and of equal duration (evoked by material of equal units of complexity).

The characteristics of a reading response are largely determined by the response requirements of the cues presented (letter sounding, word recognition, word analysis, or comprehension), and by the physical movement involved (oral, kinesthetic or tactual, and graphic). Each task can be further defined according to specific types of word recognition, such as recognition of short vowel a in three letter words; or specific types of word analysis, such as analysis of two-syllable words ending in ly; and specific types of comprehension--details, or main idea, or interpretation, for example--in the form of questions or closure format.

For response data to be reliable, responses must be measured as they occur in active cycles of movement (Kunzelmann, 1968). A cycle of movement begins as the movement begins, and ends as the movement ends. Four movement cycles are involved in writing the letter A four times in one minute. All letters, numbers, or symbols can be defined as movement cycles when they are being written. In fact, any unit or behavior, once identified by its basic cycle of movement, is measurable.



Time in Seconds

*After Kunzelmann, 1968

Movement cycles, furthermore, must be basic enough to maintain comparable characteristics as materials become more complex and conditions systematically change. Otherwise comparisons of the influence of different conditions are not possible.

Reinforcing Reading Responses

Reading specialists generally feel that the reading materials and the instruction prior to reading are the major factors in developing reading performance. But research in behavioral psychology and education now can tell us how any behavior--including reading--comes under the control of relevant stimuli. This research states that the consequence of performance, when it is reinforcing and systematically applied, is a primary factor in skill development. The independent variables within the classroom are as crucial to improving the child's performance as are the instructional materials presented to him. Reinforcement--whether in the form of verbal, social, academic, or other reinforcers extrinsic to usual classroom activities--when systematically used and relevant to the child, is the major variable in keeping the child at his task and working accurately once his level of skills is determined.

Reinforcement is also a primary factor in the discrimination of reading stimuli such as *b* and *d*. Technically, reinforcement establishes stimulus control. That is, a response immediately followed by an event which is reinforcing has a high probability of being repeated (Ferster and Skinner, 1957), and the environmental conditions present when the response was reinforced become discriminative stimuli that control the child's response in the presence of the same or similar stimuli (Terrace, 1966; Ferster and Perrott,1968; Haring, 1968).

The sensitivity of reinforcement as an influence on behavior can be readily seen when one considers that any stimulus has several observable dimensions. For example, the word "elephant" can be identified by its configuration; its length; its beginning, middle, or ending letters; its syllables; or by several or all of its sounds. Through reinforcement one or more of these dimensions may control the response which occurs in its presence; an effective sequence of cues will ensure that the relevant dimension(s) gain control. Once a dimension gains control, the child continues responding to that dimension, ignoring the other dimensions unless reinforcement contingencies change. Inappropriate stimulus control occurs when the reading stimuli are not introduced to highlight their relevant dimensions in such a way that correct responses are made to them and reinforcement can follow.

The systematic presentation of reinforcement is such a powerful influence in the acquisition and maintenance of reading skills that even the scheduling of its occurrence will influence the level of performance achieved. For example, during the acquisition of a skill, frequent reinforcement should promote a higher rate of accurate responses in a given time than infrequent reinforcement. But when reading performance is occurring at a nearly maximum level of productivity, reinforcement is necessary only intermittently. For the purpose of this discussion, the reader needs to remember only that the systematic use of conditions and events as reinforcers contributes to the acceleration, maintenance, or elimination of behavior.

Contingency Management

Reinforcement cannot be haphazardly used in the development of reading skills. Precise management of the relationship between reading behaviors and their consequences is as essential in research and instruction as the proper sequencing of cues. Effective use of reinforcers--their amount, their timing in relation to the length of responding or the number of reading responses, and the changes in amount and frequency of reinforcement--is contingency management. Contingency management represents teaching at its best and research with widest control of influencing variables. Although its major focus is on reinforcement, contingency management in reading also requires attention to the presentation of cues relevant to reading responses.

There is currently a wealth of information available from behavioral research to promote more effective instruction in reading today. But extensive research is still needed on the systematic use of this powerful process for skill development.

Experimental Analysis of Reading for Accurate Measurement

The objectives of an experimental analysis of reading are to study reading processes in terms of changes in response patterns due to the function of variables systematically manipulated. However, accuracy in the analysis of these variables and in the measurement of reading behaviors is not possible without a structured framework within which to control and introduce these conditions for reading. There are several research designs which will provide such a framework.

The designs obtain in several different ways a picture of reading performance under one set of conditions before a new condition is introduced to influence performance. These designs allow for conditions to be changed systematically after baseline measurement, as measurement of reading performance continues, thus providing response data for comparison of effects.

Obtaining a baseline measurement of performance is not difficult. A setting is first arranged whereby the conditions present for reading instruction are identified and controlled so that a stable pattern of reading responses occurs. When one of the conditions for reading instruction is changed, rate of correct and incorrect reading responses may change (transition state) until the rate again stabilizes (a new steady state) under the second set of conditions. Because of the predictable nature of behavior in relation to environmental conditions, these steady states and transition states are replicable. Therefore, the influence of other conditions for reading instruction can be investigated against the known patterns of reading performance.

For example, consider that the investigator is interested in studying several variables which might influence the number of words learned from word lists having comparable characteristics. The variables might be the tape recorder, assistance from peers, and no instruction at all, each compared to group instruction. Group instruction would be the baseline condition; performance records would be obtained in a number of sessions using group instruction. When the number of words learned daily appeared to stabilize for each child, one of the new variables would be introduced as the instructional procedure for learning the list of words and continued over a number of days while performance patterns were observed to determine if and when this new condition influenced a change in rate of word learning. Then the instructional condition would revert to group instruction to determine whether or not performance returned to the original pattern.

The investigator might select a multiple baseline design using group instruction as the baseline condition, and he would introduce, one at a time, each of the other three conditions for teaching reading and evaluate their effects on performance.

He could obtain baseline measures of performance on three different types of reading responses made under group instruction. Then he could introduce one of the new instructional procedures to one type of reading response, while continuing group instruction for the other two types of responses. This design is best for evaluating the effects of any type of reinforcer, such as comparing the influence of the teacher's praise compared to time earned for self-directed activities.

If performance patterns change systematically as the conditions change, the investigator knows which of the instructional conditions is most effective, and for which children. The value and strength of these designs comes from knowing the pattern of performance under one set of conditions so that it can be compared to a change in performance under another set of conditions. If performance patterns change for most students in a similar way under these probes, they serve as replications of the effects of these variables. Furthermore, reliable information concerning methods for individual children as well as for the group is obtained.

The effectiveness of experimental analysis techniques and contingency management has been demonstrated in three research projects. In the first, four severely retarded readers, in the third, fourth, and fifth grades, were taught in a highly structured environment at the Experimental Education Unit of the Child Development and Mental

Retardation Center at the University of Washington. The use of programmed texts and the arrangement of reinforcement led to high rates of reading, and the subjects progressed in instructional reading levels from one and a half to four years over five months of instruction (Haring & Hauck, 1969a). A similarly designed program was then put into effect with a class of twenty-four children in a public school. The variables investigated were those of extra time for gym and art classes as reinforcement for increased reading rates. The rates of most children accelerated under this arrangement of contingencies (Hauck & Haring, 1970). Finally, a program of contingency management was used with 230 disadvantaged children in a special six-week remedial class. The children earned minutes of free time for their academic responding (Haring & Hauck, 1969a). In all of the projects described the arrangements of contingencies were based on the individual performance rates obtained through continuous measurement of behavior.

Statistical procedures are available for determining the significance of the change in performance rate. If a visual analysis of data is not definitive enough, the recently introduced R_n statistic (Revusky, 1967) is a non-parametric procedure which permits statistical comparisons of individual mean data from condition to condition. Using a statistical experimental design, permitting a rank order analysis of the data of six subjects, each of whom performs as experimental subject once and control subject five times, one can determine the significance (at the .05 level of confidence) of the experimental treatment.

Experimental analysis is not a methods approach to reading, but rather a measurement approach, a set of procedures by which one can obtain valid, reliable measurement of the performance of the individual child in order to obtain information about the effective arrangement of conditions under which the child learns to read. These procedures neither exclude nor foster any one method, but permit the evaluation of any method, if the variables are precisely identified. Procedures for the experimental analysis of reading offer the researcher the opportunity to build a scientific body of knowledge on the reading process while at the same time offering the teacher the opportunity to evaluate the effectiveness of his teaching.

Recommendations

Investigators in the field of reading must turn their attention to three major areas: (a) the improvement of research procedures, (b) the improvement of professional preparation, and (c) motivation to maximum reading performance. Reading research must focus on the three components of reading: reading cues, reading responses, and conditions which motivate performance, and all research must precisely identify, control and measure the variables of the reading process.

Professional training must emphasize procedures which will develop teacher competencies in reading instruction to promote systematic and individualized progress for the child. Training must emphasize: (a) procedures for selecting, sequencing, and presenting reading materials appropriate to each child; (b) assessment of performance through continuous measurement procedures of direct observation and recording; and (c) use of procedures to motivate performance on reading tasks.

Finally, the field of reading must be concerned with motivation of reading performance. Typically, the problem reader is described as never completing assignments, daydreaming, or having a short attention span. These descriptions pertain to the child's level of motivation, including his error rate in word recognition and comprehension. Because of the role of reinforcement in skill development, both research and professional training must begin to investigate and use classroom variables that motivate performance. It is critical that educators begin to view the consequences of performance as variables of motivation.

Conclusion

Experimental analysis of reading behavior is a new and important tool in the teaching of reading. When the observable responses that comprise the act of reading are carefully measured and the variables of the learning environment are carefully controlled, the conditions affecting the learning process are brought under the control of the teacher. The procedures of experimental analysis enable the teacher to evaluate the instructional materials, the child's performance, and the effectiveness of his arrangement of conditions. On the basis of classroom data (rate of reading responses), he can make decisions on an objective basis rather than relying on subjective judgment or periodic tests. Individualized instruction can be arranged for each child, but it does not require constant teacher attention to the child. It means, rather, that the conditions are arranged specifically for the child so that he works with maximum accuracy and efficiency. New trends in reading instruction should be directed toward research procedures that determine effects of environmental variables on reading behavior, toward teacher training so that all teachers will be equipped to use the tool of experimental analysis in the classroom, and toward application of reinforcement principles as motivation for performance.

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UNDERSTANDING LEARNING DISABILITIES

J. Gerald Minskoff

Learning disabled children abound in our Nation's schools. There is no question but that general education has hardly begun to cope with the needs of these children who evidence serious and specific learning disabilities. Although the incidence of learning disabilities in the school-age population has been conservatively estimated at from one to three percent by the National Advisory Committee on Handicapped Children, many experts in special education and learning disabilities estimate the incidence as being substantially higher.

The area of learning disabilities and the fund of knowledge it embodies is an integral part of the field of special education for the handicapped. Most of the professional workers in learning disabilities have extended and committed themselves into this area from various other areas of handicap in the process of seeking approaches and methods to deal with the learning problems of children who do not fit neatly into other categories of handicap.

In its First Annual Report to the Subcommittee on Education of the Committee on Labor and Public Welfare of the U.S. Senate (January 31, 1968), the National Advisory Committee on Handicapped Children (NACHC) selected, from among a number of areas needing development, special learning disabilities as one of four issues current and crucial at this time. The NACHC defined this population as follows: "Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps; to mental retardation, emotional disturbance, or to environmental disadvantage."

There are, of course, several other definitions of learning disabilities, each from the base of different disciplines such as medicine, psychology, etc.; however, all the definitions have a consistent, singular element which permeates the concept of learning disabilities. This element, in the most generic sense, is that the learning disorders are usually represented by a significant discrepancy (generally two or more years) between the level where a child is expected to be functioning and the level where he is actually found to be functioning in one learning process or another. Educationally speaking, an expectancy level is usually formed on the basis of people who interact with a child, such as teachers, parents, psychologists, etc., and the criteria they use in assessing a child. An estimate of how he should ordinarily be behaving is inferred from a number of things--such as the child's chronological age, mental age, and/or his behavioral and physical characteristics. This inference or expectancy in any one area tells us where he is performing. If the discrepancy is two or more years, then the child may be said to have a learning disability. Some authorities perceive this discrepancy as the result of the effects of some neurological impairment, often called minimal brain dysfunction. However, it would seem that for the purpose of educational planning, the basic etiology or cause of the problem makes comparatively little difference as long as appropriate educational practices can be employed with these children.

Learning disabilities fall, generally, into three main categories: perceptual-motor problems; language and communication disorders; and academic subject disabilities such as arithmetic, computation, or spelling. These problems may evidence themselves in such behavior as: inability to transfer single letters into whole words; reversals of letters and numbers; impaired judgment of distances; poor spatial orientation; and the like. Other disabilities, singular or in association, may occur in the processes of memory, thinking, attention, coordination, auditory or visual closure, and inability to express ideas verbally or motorically. These disabilities are but a few of the many types of problems which prohibit children from optimal learning.

School districts across the nation are only just beginning to feel the impact of need in providing services for the learning disabled children in our school population. Although a comprehensive survey is needed to determine the extent of such services, it is generally believed that school districts tend to use one of three basic approaches in their attempts to meet the needs of children with learning disabilities.

The three prevalent educational programs in operation across the country are: resource classrooms, self-contained classrooms, and itinerant teacher programs. A resource teacher would be employed by the school district or by a county board of education, for example. She may be assigned a specific group of children and have her base of operations in a particular school building. Those children determined to be eligible and in need of special assistance are assigned various periods with this teacher during the day. These periods often coincide, in the schedule, with the area of academic study in which the child is experiencing the greatest difficulty. For example, if a child is experiencing difficulty in reading, then during the reading period or perhaps a period associated with reading problems and reading concepts, the child would go to the resource classroom and receive intensive work in the various processes of reading or language causing the difficulties in order to remediate these particular problems. The resource teacher also serves as an advisory to the classroom teacher in educationally diagnosing and remediating learning difficulties so that many learning disabled children need not leave their classroom at all. This type of program tends to provide the most efficient and practical method of working with learning disabled children. It has the advantage that the children remain with their peers in the regular classroom most of the time and it is assumed, as a result, that their identification is basically with normal children.

In the self-contained classroom, children associate almost entirely with other handicapped or other learning disabled children. This program is of most help for those children who are experiencing problems of such magnitude in learning that it is believed that they must be removed from the regular classroom. In this type of program, the children spend the entire day in a special class. They may leave the room for various activities and other functions, but they are primarily assigned to the special class. The children that are enrolled in self-contained classrooms usually experience moderate to severe educational problems. The self-contained classroom program is necessary for some children, although a greater number of children with learning disabilities can and should be educated most effectively through the utilization of a resource or itinerant teacher approach.

The itinerant teacher approach is traditionally utilized by some of the more rural school districts. This program operates in a manner similar to the resource room program except that, instead of the children coming to the teacher, the teacher travels from school to school to the children. This provides the opportunity for the teacher to work with selected children during a specific period of time.

Perhaps the most immediate and significant need in the field of learning disabilities right now, aside from the needs of identification, diagnosis, and ultimate remediation of learning problems, is that of leadership and teacher training. The training of leaders and advanced graduate students subsequently results in the training of researchers, the setting up of supplemental services and research centers to improve diagnostic and remedial techniques, and the training of teachers. In addition, in-service programs could be facilitated for teachers who already work with children, thereby providing immediate and direct service to school districts as well as face-to-face contact with learning disabled children across the country.

The problem of learning disabilities has had an impact in many different ways. For example, many local county and state education administrations have provided for--in spirit, if not with monetary means--the vehicle with which to establish classes for the learning disabled. Also, a few years ago, a major organization was formed called the Association for Children with Learning Disabilities (ACLD). This organization now numbers over 11,000 people in its membership and claims many affiliates, both on the state and local level across the nation. Primarily, the ACLD is made up of parents of children who are learning disabled, but there is also a component of professionals and paraprofessionals in this organization which joins with the parent group to form a vehicle for the dissemination of information for the help of parents who require knowledge and information pertaining to schools, to services, to teacher-training facilities, etc. The organization also provides a forum for professional and public discussion of new ideas and research in the field of learning disabilities.

More recently, the Council for Exceptional Children chartered the Division for Children with Learning Disabilities (DCLD), a professional subgroup for teachers and other workers in the field of learning disabilities.

In addition to the above, many textbooks for teachers in training, or teachers in service, have been written. There have been many published articles in the professional journals throughout the past ten years which are of major concern to the field of learning disabilities. Too, there have evolved two major journals, devoted entirely to the area of learning disabilities, which are well formulated and which enjoy a wide distribution among professional and other interested parties.

Across the nation many of our major colleges and universities and teacher-training institutions have established programs, usually in the Departments of Special Education or related disciplines, for the preparation of teachers and other workers in the field of learning disabilities. Such programs cover the range of preparation of personnel in some of the following ways: preparation of doctoral-level people to train other teachers and develop programs in other schools, preparation of professionals to do research either in a university or clinic setting, preparation of undergraduates who will eventually go into teaching, and preparation of a specific type of individual known variously as a diagnostic remedial teacher, a clinical teacher, a special learning disabilities consultant, diagnostic teacher, learning disabilities specialist, and the like. The essence of such training, regardless of the label associated with the product, is the provision in our nation's schools of a type of individual who can interact with the child as very few other trained individuals have previously been able to do.

The increased demand for trained specialists and teachers and high-level professionals in this field of learning disabilities

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coincides remarkably with the demand by the state and local school administrators for such specialists. Essentially, it has been impossible to train leadership and such personnel as fast and as quantitatively as the needs of the field are demanding. This same factor applies to provisions for educational services such as clinics, diagnostic centers, state aid to public schools, and other agencies, as well as to the growth and development of research centers so vitally needed in coping with problems of learning disabled children.

Efforts to meet these crucial needs have been championed by many members of Congress with the result that, on April 13, 1970, President Nixon signed into law Public Law 91-230 entitled: "The Elementary and Secondary Amendments of 1969." This new legislation includes Special Programs for Children with Specific Learning Disabilities and authorizes provisions for:

(1) research and related purposes relating to the education of children with specific learning disabilities;

(2) professional or advanced training for educational personnel who are teaching or are preparing to be teachers of children with specific learning disabilities; or for persons who are or preparing to be, supervisors and teachers of such personnel; and,

(3) establishing and operating model centers for the improvement of education of children with specific learning disabilities. These centers would perform such activities as (a) provide testing and educational evaluation to identify learning disabled children, (b) develop and conduct model programs designed to meet special educational needs of such children, (c) assist appropriate educational agencies or other organizations in making such model programs available, and (d) disseminate new methods or techniques for overcoming learning disabilities.

In summary, the area of learning disabilities is of crucial import in our nation. Thousands of our school children are experiencing failure because of such special learning disabilities. Such a child is the "dunce" of yesterday. In this respect, "learning disability" is a newcomer among the handicaps classified as affecting children. It has become more and more noticeable as the educational requirements for most occupations have increased. Years ago, most children with learning disabilities left school at an early age--after only one or two years of failure. Later on such ex-failures might become successful and respected members of the community after completing on-the-job training successfully in one of the skilled trades. Today, the youth with a learning disability may be a failure even in our public vocational schools, so great are the additional skills and knowledge required. Only in recent years are these children being identified, under a myriad of terms and names and descriptions. But no matter what they are called, many will inevitably fail in school and become "drop-outs." All authorities agree, however, that these children will be an increasing problem unless:

(1) Their handicap is discovered early;

(2) Their problems and difficulties are diagnosed correctly; and

(3) They are given the special educational and social services they need.

DIRECTORIES OF REMEDIAL READING SERVICES

Albert J. Harris

The parent whose child makes very unsatisfactory progress in learning to read often has real difficulty when he tries to find out what resources are available in his community for help with this kind of problem. In cities there may be facilities of many different kinds that can provide help; but many of them may not be known to the people to whom a parent is apt to turn first for advice and information: the family physician or pediatrician, or the school teacher, principal, or counselor. Comprehensive listings of facilities that offer diagnostic and treatment services for reading disability would be highly useful, but such listings are rarely available.

The feasibility of doing a community survey and publishing a directory of services for the disabled reader has been demonstrated by the Junior League of the City of New York, whose survey has been completed and whose directory is now available. The activities of their Reading Disabilities Project in preparing the directory may well serve as a model for similar activities in other communities. These activities included the following:

1. A committee of about a dozen young women began by asking a few local reading specialists if the compiling of a directory would fill a useful community need.

2. Upon receiving uniformly affirmative answers, they next interviewed several local specialists on reading disability, and they read some recommended literature to get better informed on the nature and treatment of reading disability.

3. They next sought advice on what to include in a questionnaire and how to compile a list of hospitals, clinics, agencies, etc., to which to send it.

4. The questionnaire was reviewed by the committee's professional advisor and went through several revisions before it was considered satisfactory. This questionnaire could well be used in other communities.

5. A mailing list was drawn up which included the public and private schools, college and university clinics, hospitals, out-patient clinics, mental hygiene and child guidance clinics, social work agencies, facilities listed in previous lists of remedial resources, and organizations advertising remedial reading programs. The tentative list

was reviewed by several knowledgeable people and a few additions were made.

6. The questionnaire, accompanied by an explanatory statement, was sent to all on the list. If no answer was received, a second questionnaire was sent. Follow-up telephone calls were made in some cases.

7. The replies were edited into a uniform format and prepared for printing. An explanation of the purpose of the directory and the procedure followed was prepared. It was emphasized that the descriptions were descriptive and not evaluative.

8. At this writing it is expected that several thousand copies of the directory will be printed and distributed free of charge.

A similar survey and directory would be desirable for every city of substantial size. The volunteers needed, and part or all of the funding, can be secured in many communities by involving one or more community groups, such as women's organizations and fraternal orders. Initiative and consultation, and perhaps some financial support, could be provided through the Department of Health, Education, and Welfare.

In addition to the service function such directories could provide, they could also give a factual basis for evaluating the adequacy of overall community resources for reading disability, for spotting gaps in the needed variety of resources, and for encouraging more cooperative planning among the organizations providing services.

Finally, as more and more community remedial reading directories become available, they could provide much of the information needed in order to compile a national survey of facilities for the treatment of reading disability.

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